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PROCEEDINGS

JAN
31
1913

OF THE

Biological Society of Washington

VOLUME XXV

1912

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

PROCEEDINGS.

The Society meets in the Assembly Hall of the Cosmos Club on alternate Saturdays at 8 P. M.

January 6, 1912—491st Meeting.

President E. W. Nelson in the chair and 38 persons present.

The program for the evening was a discussion on the subject, "Recent Environmental Changes and Relative Biogenic Stability," led by David White and participated in by J. W. Gidley, Paul Bartsch, C. A. Davis, A. D. Hopkins, E. W. Nelson, Wm. Palmer and others.

January 20, 1912—492d Meeting.

President E. W. Nelson in the chair and 93 persons present.

T. S. Palmer announced that three additional bird reservations had recently been set aside by executive order of President Taft, making the present total number of such reservations 55.

W. P. Hay exhibited by lantern slides two photographs of a water spout observed by him last summer on the coast of North Carolina.

The following communications were presented:

"Elk Herds in Jackson Hole, Wyoming": E. A. Preble.

"A Naturalist among the Igorotes of the Philippine Islands": H. V. Harlan.

February 3, 1912 493d Meeting.

Vice-President J. N. Rose in the chair and 56 persons present.

Paul Bartsch spoke briefly of the faunal barrier to fresh water organisms presented by the muddy waters of the Missouri River.

The following communications were presented:

"The Most Promising Animals for Fur-Farming": Vernon Bailey.

"Fisheries in Alaska": John Cobb.

February 17, 1912—494th Meeting.

Vice-President A. D. Hopkins in the chair and 55 persons present.

E. M. Kindle exhibited lantern slides showing impressions made by tadpoles in the ooze of shallow ponds and suggesting that similar markings found in rocks had probably a like origin.

The following communications were presented:

"Notes on Deep Sea Fishes from the *Albatross* Philippine Cruise": Hugh M. Smith and Lewis Radcliffe.

"Botanizing in Panama": A. S. Hitchcock.

March 2, 1912—495th Meeting.

President E. W. Nelson in the chair and 42 persons present.

A. B. Baker read abstracts from a letter written by the Director of the Transvaal Zoological Gardens at Pretoria, referring to some prominent animals of the South African fauna.

The following communications were presented:

"The Story of Evolution as Revealed by a Scolytid Beetle": A. D. Hopkins.

"Habitat, Coloration and Evolution as shown by Birds on a Javan Mountain": Wm. Palmer.

March 16, 1912—496th Meeting.

President Nelson in the chair and 42 persons present.

Hugh M. Smith exhibited lantern slide pictures of a bluebird frozen fast in the opening of a hollow log.

T. S. Palmer spoke of recent distribution of elks from Jackson Hole and elsewhere to various State and National game preserves.

The following communications were presented:

"Translations from Torquemada's 'Monarquia Indiana'": E. W. Nelson.

"The Ear-flower of the Aztecs": W. E. Safford.

"The Wilting Coefficient in the Study of Plant Associations": H. L. Shantz and L. J. Briggs.

March 30, 1912—497th Meeting.

President Nelson in the chair and 54 persons present.

The following communications were presented:

"Why is a Weed": C. V. Piper.

"Introduction of Tropical Fruits into the United States": David G. Fairchild.

April 13, 1912—498th Meeting.

President Nelson in the chair and 59 persons present.

B. W. Evermann exhibited dyed and undyed skins of the fur seal and made remarks on classification of these furs and the aims of the Bureau of Fisheries regarding the fur seal.

The following communications were presented:

"The Fossil Flora of Alaska": Arthur Hollick.

"Winter Animal Life About the Base of Mt. McKinley": Charles Sheldon.

April 27, 1912—499th Meeting.

President Nelson in the chair and 32 persons present.

The following communications were presented:

"Remarks on a Skeleton of the Dinosaur *Stegosaurus*": C. W. Gilmore.

"Are Rabbits Rodents?" J. W. Gidley.

"Early Bird Migration in a Late Spring at Washington, D. C., 1912": Wells W. Cooke.

October 19, 1912 - 500th Meeting.

The 500th meeting of the Society was celebrated as a field day at Plummer's Island, Potomac River, the members and friends being the guests of the Washington Biologists' Field Club. In spite of a threatening morning about forty persons attended. A field luncheon was served and an informal program was followed, Paul Bartsch in the chair. Reminiscent speeches were made by Theodore Gill, L. O. Howard, F. A. Coville, Dr. Clara Ludlow, and others.

November 2, 1912—501st Meeting.

Vice-President J. N. Rose in the chair and 38 persons present.

A. C. Weed reported observations on the habits of the common coot.

The following communications were presented :

"Injury to Foliage of Locust Trees by the Locust Leaf Beetle" : A. D. Hopkins.

"Faunal Areas of the Pacific" : Austin H. Clark.

"Collecting in the Bahamas" : Baul Bartsch.

November 16, 1912—502d Meeting.

Vice-President W. P. Hay in the chair and 55 persons present.

Hugh M. Smith reported very late flowering of Paulownia and other plants near Washington, D. C.

Barton W. Evermann reported observations on the habits of crows in the West.

A. D. Hopkins presented notes by F. C. Craighead reporting that certain beetles are likely to be a factor in the control of chestnut blight.

The following communications were presented :

"A New Cave Fauna" : J. W. Gidley.

"The Present and Future Status of Ducks and Geese in the United States" : Wells W. Cooke.

November 30, 1912—503d Meeting.

Vice-President J. N. Rose in the chair and 36 persons present.

The following communications were presented:

"Notes on Forest Insect Depredations in Yosemite National Forest": A. D. Hopkins.

"Eighteen Species of Birds New to the Pribilof Islands Including Four New to North America": Barton W. Evermann.

"Development of Teeth and Bones in Fishes" : A. C. Weed.

December 14, 1912—504th Meeting.

THIRTY-THIRD ANNUAL MEETING.

Vice-President W. P. Hay in the chair and 19 persons present.

The reports of the recording secretary and treasurer were read and accepted.

The following officers were elected for the year 1913:

President: E. W. Nelson.

Vice-Presidents: W. P. Hay, J. N. Rose, Paul Bartsch, and A. D. Hopkins.

Recording Secretary: D. E. Lantz.

Corresponding Secretary: N. Hollister.

Treasurer: J. W. Gidley.

Members of the Council: Hugh M. Smith, Vernon Bailey, Wm. Palmer, A. B. Baker, and A. K. Fisher.

President E. W. Nelson was elected vice-president to represent the Biological Society in the Washington Academy of Science.

In the absence of the president the appointment of standing committees was deferred.

JAN 31 1913

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Vol. XXV, pp. 1-2 January 23, 1912

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

JAN 30 1912

DESCRIPTION OF A NEW WATER MUNGOOSE FROM EAST AFRICA.

BY N. HOLLISTER.

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A collection of mammals made in British East Africa and Uganda in 1910 by Mr. John Jay White includes, among other desirable material, a mungoose of the *paludinosus* group from the Guas Ngishu country, which apparently represents the true *robustus* of Gray, described from the White Nile. Comparison of this specimen with others of the group in the United States National Museum collection makes it plain that the form found on Mount Kilimanjaro is distinct from *robustus*, as it also is from the more southern forms of *paludinosus*. All the water mungooses from British East Africa and the Kilimanjaro region have heretofore been referred to *robustus*.

Mungos paludinosus rubescens subsp. nov.

Type from Mount Kilimanjaro, East Africa, at 4000 feet. Adult ♂, skin and skull. United States National Museum No. [illegible]. Collected November 8, 1889, by Dr. W. L. Abbott.

Characters.—A medium sized form, considerably smaller and lighter colored than *Mungos p. robustus;* size about as in *M. p. rubellus*, but coloration much darker. Skull with comparatively very small audital bullæ.

Color of type.—Nose to eyes, clear dark sepia; lips and chin yellowish-buff; cheeks, forehead, crown, and nape, grizzled; neck, body, and base of tail brighter, with no gray, and with more reddish. Underfur sepia, tipped with cinnamon. The long, glossy, overlying hairs of back, black, with or without rings of hazel and bay; overlying glossy hairs of sides and underparts lighter brown, ringed and tipped with cinnamon-rufous. Legs and feet, blackish-brown; tail at base like back, but with long hairs broadly tipped with bay; gradually blending to the pure black terminal third.

Skull and teeth.—Compared with the skull of the adult male *robustus* the skull of this new form is considerably smaller, with wider rostrum; opening of anterior nares actually larger; audital bullæ very much reduced, little more than one-half the bulk. Compared with a skull of *paludinosus* from West Africa (no skulls of this form from the Cape are available) it is slightly smaller, with smaller teeth, and very much smaller bullæ. Teeth as in *robustus*, but relatively larger; m^1 actually larger.

Measurements of type (from dry skin).—Head and body, 610; tail, 330. Skull of type compared with measurements of the skull of the Guas Ngishu specimen of *robustus*, the latter in parentheses: Greatest length, 109.5 (118.6); condylobasal length, 102.5 (108.2); basal length, 94.1 (101); zygomatic breadth, 55.5 (—); postorbital constriction, 15.3 (15.5); upper tooth row, including canine, 37.8 (39.1); upper molar-premolar row, 29 (30.5); length of mandible, 73.2 (75); lower molar-premolar row, 33.1 (35).

Vol. XXV, pp. 3-8 January 23, 1912

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

JAN 30 1912

NOTES ON THE DISTRIBUTION OF SOME COLORADO MAMMALS.

BY EDWARD R. WARREN.

During the summer of 1911 I made a somewhat extended collecting trip by wagon through north-central Colorado, accompanied by Mr. H. R. Durand as assistant. Work was first done on the plains and "Divide" region as far east as Cedar Point, Elbert County, and then turning westerly and northerly as far as Pawnee Buttes, and thence westerly again, the mountains were reached by way of Log Cabin, Elkhorn and Chambers Lake, and the Medicine Bow Range crossed by way of Cameron Pass into North Park, which was set off as Jackson County two years ago. Most of the work was done on the west side of the Park, and then Buffalo Pass crossed to Steamboat Springs, and the return to Denver was via Gore and Berthoud Passes. The collections made on this trip resulted in greatly extending the known range of one species of chipmunk, and add something to our knowledge of the distribution of two others; another record of *Phenacomys* was added to the very few Colorado occurrences of that genus; certain other notes were made which seem worthy of record, and I have added some notes lately made by myself in other portions of the State, besides the two records of *Nycteris borealis* which I am permitted to publish herewith and for which due credit is given under that species.

I am under obligation to the Bureau of the Biological Survey for the identification of the specimen of *Phenacomys*. Mr. Durand kindly loaned for comparison some specimens collected by himself on the expedition.

Zapus princeps Allen.

Two specimens of this jumping mouse were taken on Mt. Zirkel, Jackson County, July 11 and 12, 1911, at 9500 feet; one was taken at Brand's ranch, near Lake John, 8200 feet, July 7, and one on the Gore Pass road, about five miles east of Toponas, Routt County, 8300 feet, August 4, 1911. This species seems to be widely distributed through the mountainous parts of Colorado, though but comparatively few records of localities have been published.

Microtus pauperrimus (Cooper).

A single specimen of this species was taken at Walden, North Park, Jackson County, June 28, 1911. It was captured on an alkali flat west of the town, the trap being set under a greasewood (*Sarcobatus*) bush. I was unable to secure any more, though many traps were kept set in the locality for several days. The Pigmy Vole has such a very interrupted distribution in Colorado that each new locality should be recorded.

Phenacomys orophilus Merriam.

A specimen of this species was trapped by H. R. Durand near Buffalo Pass at about 10,000 feet altitude, July 25, 1911. This makes the third record for Colorado, the other two being one taken by myself at Lake Moraine, El Paso County, and a specimen in the National Museum from Fairplay, Park County.* The genus is certainly very rare in the State, for altogether only five Colorado specimens are known of the two species which occur here.

Neotoma floridana baileyi Merriam.

Merritt Cary† mentions finding woodrats' nests at Cedar Point, Elbert County, a few miles northwest of Limon, and states that the animals are probably this species. In a letter written a couple of years ago he spoke of this to me, suggesting that I try and obtain specimens. I paid a visit to the place May, 1911, finding several fresh nests, and collecting one individual, which, as Cary surmised, proved to be *Neotoma f. baileyi.* This is the most northwestern occurrence in Colorado of this species thus far recorded.

Reithrodontomys megalotis (Baird).

A new Colorado record for the Big-eared Harvest Mouse is a specimen sent me by C. H. Smith in November, 1910, and taken at Coventry, Montrose County, altitude 6800 feet, some time that fall. The animal was captured by Mr. Smith's cat, which should have due credit for taking a species which had escaped the notice of Smith, Merritt Cary, and myself, all of us having collected in that locality. The species must be rather rare in that region, or it would have been taken before.

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* Cary, N. Am. Fauna No. 33, p. 119. 1911.

† N. Am. Fauna No. 33, p. 115, 1911.

Citellus elegans (Kennicott).

August 7, 1911, we saw a number of Wyoming Ground Squirrels immediately below the mining town of Empire, Clear Creek County, 8260 feet altitude. The animals were seen along the road just after passing through the town. I had never heard of this species being anywhere in that region before, and am somewhat at a loss to account for its presence. To my knowledge the nearest point at which it occurs is Fraser, some fifteen miles distant in an airline, and on the other side of the Continental Divide. It may possibly have crossed Berthoud Pass, though this hardly seems likely, as most of the intervening country is not of the sort it frequents, being very mountainous, and the Pass itself having an elevation of 11,000 feet. Nor in fact was the locality where I saw these such as the animal prefers, being a rather narrow rocky gulch. It seems more than likely that this colony has sprung from pet animals some one has turned loose or allowed to escape. If allowed to exist and multiply these animals may eventually become pests by finding their way down the Clear Creek Valley and out into the more open country where there are cultivated lands. They can not do much harm at their present location.

Citellus obsoletus (Kennicott).

A specimen of Kennicott's Ground Squirrel was collected, and a few others seen by the roadside between Simla and Mattison, Elbert County, May 24, 1911. This is the valley of Big Sandy Creek, and on the southern slope of the Arkansas-Platte Divide, and I think the most western record for that district. June 11, 1911, two were secured near Fosston, Weld County. Not a great deal is as yet known of the distribution of this species in Colorado, but it will no doubt be found in most of the sandy portions of the northeastern plains.

Eutamias quadrivittatus (Say).

The range of this species was extended on the eastward of the Medicine Bow Range considerably to the north by the capture of a specimen about 2 miles east of Log Cabin, Larimer County, altitude 7450 feet, June 16, 1911. Cary* gives the known northern limit along the eastern foothills as southwest of Arkins, which is 25 miles south of Log Cabin. On the west side of the North Park specimens taken by me on Mt. Zirkel make an extension of 65 miles north of what may be considered the previous northwestern record, Yarmony Creek, Eagle County, which is almost due south of Mt. Zirkel, and the latter is only 3 miles north of Log Cabin, though over 60 miles west of that place. It should be remarked, however, that I have previously recorded† this chipmunk from Grand Lake, Grand County, which is 25 miles north of Yarmony Creek, but 45 miles east, and 55 miles almost due southeast from Mt. Zirkel. The Mt. Zirkel specimens were collected between 9300 and 9800 feet altitude. Specimens were also taken about Buffalo Pass, 18 miles south of Mt. Zirkel, at between 10,000 and 10,500 feet. From the relative situations of the four localities just named it would seem probable that the species would eventually be taken all along the Continental Divide and the Park Range in Grand, Routt, and Jackson Counties. At both Mt. Zirkel and Buffalo Pass the species was quite common; at our camp on Mt. Zirkel as common as *E. consobrinus*, and much tamer, while at Buffalo Pass it did not appear to be as numerous as the other species, and curiously enough not so familiar. I discovered this in baiting them at both places for photographing.

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* N. Am. Fauna No. 33, p. 71, 1911.

† Further Notes on the Mammals of Colorado, Colo. College Pub.: Gen. Ser. No. 33, p. 68, 1908.

Another interesting Colorado record of this chipmunk is a specimen I took on the south slope of Crested Butte Mountain, Gunnison County, at 9500 feet, October 8, 1910. It was the first of the species I have ever seen in that region. I do not know if it has any bearing on the matter, but the animal was killed near the only yellow pines I know of on that mountain, and they would hardly be growing there at such an altitude if it was not a warm southern exposure, though as noted above, this chipmunk ranges to a considerably higher altitude.

Of five chipmunks taken at Pagosa Springs, Archuleta County, in the fall of 1911, two were *quadrivittatus* and three *operarius*.

Eutamias amœnus operarius Merriam.

This species was taken at Chambers Lake, Larimer County, at an altitude of 9100 feet. Of four chipmunks taken at this locality June 19–21, 1911, two were the present species, and two *E. m. consobrinus*. It is extremely interesting to find this overlapping of the ranges of these two species, though it has been previously recorded by Cary,* who found them together at Canadian Creek, at the west base of the Medicine Bow Range, in the North Park, and also at Coulter, Grand County.

May 22, 1911, I took a specimen of this species at Elbert, a town on the Arkansas-Platte Divide, and well out toward the eastern end of the heavier timber growth. The only other record I have of chipmunks from the Divide is from Palmer Lake, at the east base of the foothills, where both *E. operarius* and *E. quadrivittatus* were taken by R. B. Rockwell. Both should be at Elbert. I saw other chipmunks there besides the one collected, but was unable to secure more.

As noted under *E. quadrivittatus*, the present species was taken at Pagosa Springs, Archuleta County, October, 1911, among the yellow pines. It does not appear to be definitely recorded from that locality.

Eutamias minimus consobrinus (Allen).

As just stated under the preceding species, this chipmunk was taken at Chambers Lake, Larimer County. Two were also taken on the North Park or Jackson County side of the Medicine Bows, a few miles below Cameron Pass, at an altitude of 9500 feet, and approximately opposite

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* Some Unrecorded Colorado Mammals. Proc. Biol. Soc. Washington, XX, pp. 24–25, 1907.

Chambers Lake. As these chipmunks range to timberline or higher, there is nothing to prevent their crossing the Medicine Bow Range.

Two specimens taken on the Buffalo Pass road seem to show a tendency toward *operarius*. The color is very like that species, so much so that from it alone I would call them such, and the measurements, especially of the hind foot, are those of *operarius*, while the skulls are unmistakably *consobrinus*. As the locality is a good distance from the present known range of *operarius* it seems best to refer them to *consobrinus*, though it will not be so very surprising if future collecting along the Continental Divide, which forms the south and west boundaries of the North Park, showed *operarius* distributed all along the south side of the Park.

Sciurus fremonti neomexicanus Allen.

Cary, N. Am. Fauna No. 33, pp. 70–71, speaks of the possibility that this subspecies may occur in Colorado, and mentions that it has been taken at Costilla Pass and Bear Cañon, New Mexico, within a few miles of the Colorado boundary. A squirrel taken by me at Tercio, Las Animas County, 7800 feet, September 24, 1909, is unquestionably *fremonti*, being identical with other specimens in my collection from various parts of Colorado. Tercio is 6 miles north of the New Mexico boundary, and about 20 northeasterly from Costilla Pass, and in the eastern foothills of the Culebra Range. It is, however, possible that *neomexicanus* may extend into the State on the west slopes of that range. To the best of my belief no collecting has been done in that region. A squirrel taken at Pagosa Springs, Archuleta County, October 1, 1911, is also *fremonti*. This place is about 20 miles north of the New Mexico boundary.

Nycteris borealis (Müller).

There are two Colorado occurrences of the Red Bat to be recorded. There are two specimens in the Colorado Museum of Natural History, Denver, taken at Wray, Yuma County, August 25, 1911, by Mr. L. J. Hersey, Curator of Ornithology at the Museum, who has kindly given me permission to publish the record. Mr. Hersey tells me they were found hanging to a wild grape vine in a creek bottom.

The other record is of a specimen in the collection of the State Historical and Natural History Society, Denver, taken northwest of Littleton, Arapahoe County, August 27, 1911. I am indebted to the Society, through Mr. Horace G. Smith, Assistant Curator, for liberty to publish this record.

It is odd that these specimens, collected but two days apart, were taken, the first mentioned nearly at the east boundary of the State, and the other at the east base of the foothills, the space between the two localities covering the entire plains region. The only other record of the Red Bat for Colorado is Greeley, A. E. Beardsley.*

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* Warren, The Mammals of Colorado, Colo. College Pub., Gen. Ser. No. 19, p. 268, 1906.

Vol. XXV, pp. 9-10 **January 23, 1912**

PROCEEDINGS

OF THE

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A NEW WEASEL FROM COSTA RICA.

BY E. A. GOLDMAN.

The weasel of Costa Rica has been commonly referred by authors to *Mustela affinis* Gray, of Colombia, but in making general comparisons in connection with the identification of specimens from Panama I find that Costa Rican examples represent a new form which is described below.

Mustela costaricensis sp. nov.

COSTA RICAN WEASEL.

Type from San José, Costa Rica. No. $\frac{13779}{37146}$, young adult, U. S. National Museum, collected by Dr. C. H. Van Patten.

General characters.—Closely allied to *affinis*, but somewhat larger; color about the same; audital bullæ relatively larger, less flattened. Similar to *tropicalis* and *perdus*, but white facial markings reduced to narrow streaks, or absent (broad and conspicuous in *tropicalis* and *perdus*).

Color.—Upper parts, including outer sides of legs and feet, blackish brown or chestnut, passing gradually into nearly pure black on neck and head; under parts from median line of belly to upper part of thighs and arms varying from buffy yellow to orange buff, paling on throat and chin to pure white; white facial markings absent in type, but present in some specimens, varying from a few isolated hairs to very narrow white streaks across forehead and cheeks; tail like back, except tip, which is black all round.

Skull.—Similar to that of *affinis*, but larger; braincase more elongated; audital bullæ relatively larger, less flattened, the anterior borders projecting more prominently from cranium. General form much as in *tropicalis* and *perdus*, but audital bullæ flatter.

Measurements.—Skull of type (skin measurements not available): Condylobasal length, 53.7; zygomatic breadth, 29; interorbital breadth, 11.7; audital bullæ, 14.5 x 8; alveolar length of upper molariform toothrow, 12.7.

Remarks.—The Costa Rican weasel is somewhat intermediate in characters between ***tropicalis*** and ***perdus*** of southern Mexico and ***affinis*** as represented by specimens from various localities from Panama southward and including a series of 10 from Merida, Venezuela, identified by Mr. Oldfield Thomas and assumed to be typical. It is like ***affinis*** in color, but in the elongation of the braincase and form of audital bullæ seems to show gradation toward the bridled weasels of Mexico.

Specimens examined.—Total number, 5, from Costa Rica, as follows: San José (type locality), 1; Navarro, 1; without definite localities, 3.

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Vol. XXV, pp. 11-1 March 19, 1912

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THREE NEW PHLŒOTHRIPIDÆ (THYSANOPTERA) FROM TEXAS AND MICHIGAN.

BY J. DOUGLAS HOOD,
Illinois State Laboratory of Natural History, Urbana.

The three species described below are large, striking, and conspicuous. All are distinguishable at a glance from their known North American relatives. It is perhaps to be regretted that two are represented by unique males, one of which is macropterous and the other brachypterous; but, after nearly four years, they are here described that the genus which they represent may be placed on record as a member of the fauna of the United States.

Phlœothrips vittatus sp. nov.

Female.—Unknown.

Male.—Length about 2.2 mm. Dorsal surface closely reticulate, non-shining; ventral surface smooth. General color by reflected light, dark mahogany brown, with a narrow, latero-dorsal, white stripe extending along the sides of the prothorax and abdomen and terminating on the seventh abdominal segment; this stripe is about as wide as the antenna, and is interrupted only on the pterothorax, where it is entirely wanting. General color by transmitted light, yellowish brown, with maroon hypodermal pigmentation; legs and tube blackish brown, non-pigmented; antennæ nearly concolorous with body and with the intermediate segments yellowish at base and apex.

Head about 1.2 times as long as wide; dorsal and lateral surfaces closely and strongly reticulate and with several moderately prominent spiniferous tubercles, of which those on the cheeks and four near center of dorsum[*] are especially noticeable; cheeks subparallel, converging rather abruptly to the eyes; postocular bristles lacking. Eyes moderately large, finely faceted, contained in length of head about two and one half times, and slightly narrower than their interval. Ocelli subapproximate, opposite center of eyes. Antennæ five-thirds as long as head; segments 3–5

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[*] It is possible that the anterior pair are the postocular bristles.

clavate, abruptly narrower apically, urn- or vase-shaped; 6 and 7 clavate; 8 sharply conical; sense cones large, moderately slender: formula[*]: 3, 1–2; 4, 1–2+^{1}; 5, 1–1+^{1}; 6, 1–1+^{1}; 7, with one on dorsum near apex; segments 1 and 2 nearly concolorous with body; 3–5 blackish brown, paler at apex and with their basal two-fifths brownish yellow; 6–8 dark blackish brown, 6 with pale pedicel. Mouth cone pointed, nearly attaining base of prosternum.

Prothorax three-fourths as long as head, and (including coxæ) about 1.8 times as wide as long; all usual spines present, dilated apically, the outer pair at the posterior angles longest, twice as long as the coxal and the pair at the anterior angles. Pterothorax slightly wider than long and broader than prothorax; sides nearly straight, slightly converging posteriorly. Wings long, nearly attaining tube, not narrowed at middle, closely fringed, veinless; subapical fringe on posterior margin of first pair double for about twenty hairs. Legs normal; fore femora not swollen, about half as wide as head; fore tarsi armed with a short tooth.

Abdomen moderately slender; segment 9 long, about equal to the tube in length, nearly circular as seen from above. Tube about five-sixths as long as head, tapering evenly from base to apex; terminal bristles nearly as long as tube. Marginal abdominal bristles short, capitate, colorless.

Measurements.—Length, 2.18 mm.; head: length, .30 mm.; width, .25 mm.; prothorax: length, .23 mm.; width (including coxæ), .41 mm.; pterothorax: width, .44 mm.; abdomen: width, .45 mm.; tube: length, .23 mm.; width at base, .09 mm.; at apex, .045 mm. Antennæ: Segment 1, 39μ; 2, 57μ; 3, 99μ; 4, 87μ; 5, 81μ; 6, 57μ; 7, 54μ; 8, 33μ; total, .507 mm.; width, 41μ.

Described from two macropterous males taken by the writer on poplar near Baldwin, Michigan, August 17, 1908.

The peculiar coloration of this insect distinguishes it at once from all other species of its genus. Its resemblance, however, both in coloration and structure, to the species of *Acanthothrips* is striking. The principal characters of that genus, as at present understood, are the presence in both sexes of a subapical tooth on the inner margin of the fore femora and the urn- or vase-like form of the intermediate antennal segments. But *Phlœothrips vittatus*, though lacking the femoral tooth of *Acanthothrips*, possesses an antenna strikingly similar to that of *A. nodicornis* Reuter, and in coloration is strongly suggestive of *A. albivittatus* m.

Diceratothrips harti sp. nov.

Female.—Unknown.

Male (macropterous).—Length about 2.4 mm. Color uniform black. Surface shining.

Head subrectangular, 1.7 times as long as wide, truncate in front; cheeks parallel, excepting for an abrupt, collar-like, basal widening about half as long as eye; dorsal and lateral surfaces faintly transversely striate;

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[*] The explanation of the formula used in the description of the antennal sense cones has been given by the author in Ann. Ent. Soc. Am., Vol. 1, No. 4, p. 285, and in Ent. News, Vol. XX, No. 1, p. 29, footnote.

cheeks with two rather stout spines at basal and apical thirds, respectively; middle of dorsum with a pair of small slender spines; two pairs of small interocular spines, one just behind the posterior ocelli, the other near anterior angle of eyes and pointing directly forward; postocular bristles pointed, about as long as eyes. Eyes small, not protruding. Ocelli moderately large, their diameter about twice as great as that of facets of eyes; posterior ones widely separated, contiguous to margins of eyes; anterior ocellus situated on extreme vertex, slightly overhanging and pointing directly forward. Antennæ inserted beneath vertex, slightly more than twice as long as head; segments 3–5 claviform, elongate, 3 slightly more than four times as long as its greatest subapical width; 6 and 7 oblong, pedicellate; 8 subconical; sense cones short, acute. Mouth cone broadly rounded at apex, reaching beyond middle of prosternum.

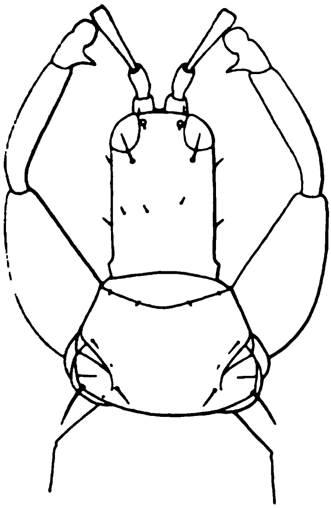

Fig. 1.
Diceratothrips harti sp. nov., male, holotype.
(J. D. H. del.)

Prothorax nearly .7 as long as head, and (including coxæ) somewhat less than twice as wide as long, surface nearly smooth; anterior angles acute, scarcely prolonged; posterior angles with three sclerites, the posterior two of which are somewhat fused with each other and with the notum; usual spines all present, the two pairs at the posterior angles much the longest, about as long as the postoculars, the others scarcely visible and shorter than those on cheeks; fore coxæ armed with a single short spine. Pterothorax slightly wider than prothorax, sides slightly arcuate. Wings long, closely fringed. Legs moderately long, without prominent spines; fore femora about as long as head and twice as

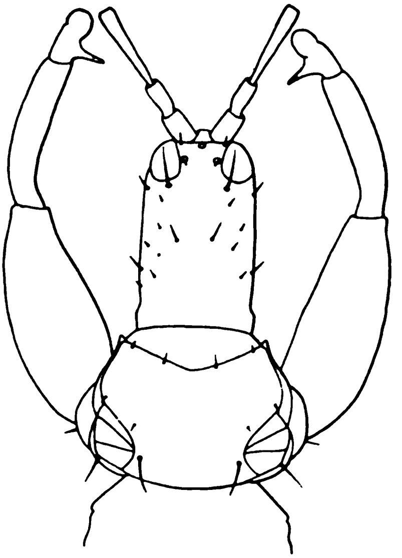

Fig. 2.
Diceratothrips longipes sp. nov., male, holotype. (J. D. H. del.)

long as wide; fore tarsi armed with a long, slender tooth about half as long as eye.

Abdomen slender, but distinctly wider than prothorax; sides subparallel to sixth segment, thence tapering to base of tube; tube slightly longer than head, expanded in basal sixth, thence tapering very gradually to near apex, which is rather abruptly narrowed; terminal bristles weak. Abdominal bristles pointed, long and strong, those on segment 9 nearly as long as tube.

Measurements.—Length, 2.36 mm.; head: length, .34 mm.; width, .22 mm.; prothorax: length, .23 mm.; width (including coxæ), .42 mm.; pterothorax: width, .45 mm.; abdomen: width, .47 mm.; tube: length, .36 mm.; width at base, .105 mm.; at apex, .048 mm. Antennæ: segment 1, 69μ; 2, 72μ; 3, 153μ; 4, 126μ; 5, 102μ; 6, 78μ; 7, 66μ; 8, 47μ; total, .71 mm.; width, .036 mm.

Described from one long-winged male taken in sweepings from grass in the South Texas Garden, Brownsville, Texas, June 27, 1908, by Mr. Charles A. Hart, for whom the species is named.

Diceratothrips longipes sp. nov.

Female.—Unknown.

Male (brachypterous).—Length about 2.3 mm. Color uniform black; surface shining.

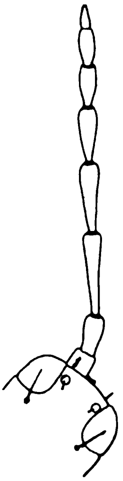

Fig. 3.
Diceratothrips harti
sp. nov., male, holotype.
(J. D. H. del.)

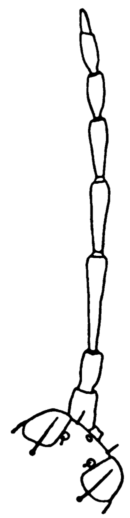

Fig. 4.
Diceratothrips longipes
sp. nov., male, holotype.
(J. D. H. del.)

Head subrectangular, 1.7 times as long as wide, truncate in front; cheeks subparallel except for an abrupt collar-like basal widening about .04 mm. in length; dorsal and lateral surfaces faintly transversely striate, set with a few short, rather stout spines which are not raised on tubercles and of which there is a longer and stronger pair near middle of dorsum and two pairs on the lateral outline at the basal and apical thirds, respectively; two pairs of small interocular spines, one just behind the posterior ocelli and the other near anterior angle of eyes; postocular bristles pointed, about as long as eyes. Eyes small, not protruding. Ocelli moderately large, their diameter about twice as great as that of facets of eyes; posterior ones widely separated, nearly contiguous to margins of eyes; anterior ocellus situated on vertex and directed forward and upward. Antennæ slightly less than twice as long as head, not inserted beneath vertex; segments 3–5 clavaform, elongate, 3 nearly five times as long as greatest subapical width; 6 and 7 oblong, pedicellate; 8 subconical; sense cones short, acute. Mouth cone broadly rounded at apex and reaching beyond middle of prosternum.

Prothorax about .6 as long as head and (including coxæ) almost twice as wide as long, surface nearly smooth; anterior angles produced into a strong, short, tooth-like projection about .17 mm. in length; posterior angles with three distinct sclerites; usual spines all present, the two pairs at the posterior angles much the longest, about as long as the postoculars, the others about as long as those on cheeks; fore coxæ armed with a single rather short spine. Pterothorax slightly narrower than prothorax, sides subparallel. Wings reduced, .7 as long as head, slightly less than five times as long as wide. Legs very long; spines short, slender, inconspicuous; fore femora very large, longer than and .7 as wide as head, and about three times as long as wide; fore tarsi armed with a long, slender, straight tooth nearly as long as eye.

Abdomen slender, slightly narrower than prothorax; sides subparallel to sixth segment, thence tapering to base of tube; tube slightly shorter than head, expanded in basal sixth and narrowed at apex, intermediate portion parallel-sided; terminal bristles weak, two-fifths as long as tube. Abdominal bristles pointed, long and strong, those on segment 9 nearly as long as tube.

Measurements.—Length, 2.27 mm.; head: length, .40 mm.; width, .24 mm.; prothorax: length, .25 mm.; width (including coxæ), .47 mm.; pterothorax: width, .42 mm.; abdomen: width, .45 mm.; tube: length, .37 mm.; width at base, .102 mm.; at apex, .048 mm. Antennæ: segment 1, 69μ; 2, 72μ; 3, 174μ; 4, 129μ; 5, 108μ; 6, 78μ; 7, 72μ; 8, 42μ; total, .74 mm.; width, .036 mm.

Described from one short-winged male taken on huisache (*Acacia farnesiana* Willd.), in the South Texas Garden, Brownsville, Texas, June 27, 1908, by Mr. Charles A. Hart.

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SEVENTEEN NEW EAST INDIAN CRINOIDS BELONGING TO THE FAMILIES COMASTERIDÆ AND ZYGOMETRIDÆ.

BY AUSTIN H. CLARK.

Professor Max Weber has done me the honor of entrusting to me for study the very extensive collection of unstalked crinoids brought together by the *Siboga* during the course of her investigations in the Dutch East Indies. The great importance of this collection may be appreciated when it is stated that it consists of some 1320 specimens, representing approximately 170 species.

The large number of new forms discovered naturally throws an entirely new light upon the systematic interrelationships of many species and genera, while the new geographic data presented will be of the greatest interest in its bearing on the study of the geographical distribution of these and other animals.

As it will take considerable time to digest all the new facts and to complete a satisfactory report it has seemed advisable to publish preliminary diagnoses of the new genera and species in advance of the final memoir, in which they will be described in greater detail and figured, and in which their relationships with other forms will be discussed.

Among the new forms there are comparatively few which show any great departure from types already known. A large number of the new species are from the Lesser Sunda Islands and represent in that region related species previously known from Japan or from Hawaii. Many of the others are from the Java Sea, and are essentially sudden local departures from well known and widely ranging East Indian types.

The small species of the Antedonidæ, of which this collection contains a large number, are most instructive in showing the very intimate connection between many genera and several subfamilies which heretofore have been considered as quite distinct. In the final report a revision of this difficult group will be included.

Palæocomatella gen. nov.

Genotype.—Actinometra difficilis P. H. Carpenter, 1888.

Diagnosis.—Post-radial structure as in the twenty armed species of *Comatula* (*C. rotalaria*); proximal cirrus segments (except the basal) elongated; outer cirrus segments short and bearing dorsal tubercles as in *Comatella;* centrodorsal large, discoidal, the cirrus sockets in one and a partial second marginal row, but the second row, instead of alternating irregularly with the first as in all the other genera of comasterids, is exactly beneath the first so that the cirrus sockets are arranged in columns, five to each radial area.

Capillaster gracilicirra sp. nov.

This new form is closely related to *C. sentosa*, from which it differs in its longer and much more slender cirri which have proportionately much longer segments. The cirri are xvii, 27–35 (usually nearer the latter), 33 mm. long; the longer proximal segments are twice as long as broad, slightly constricted centrally with swollen ends; the shorter distal segments are about as long as broad; the tenth or eleventh is a transition segment.

The arms are from fifty-one to one hundred ten in number, 100 mm. to 140 mm. long.

Type locality.—"Siboga" Station No. 320.

Capillaster tenuicirra sp. nov.

This new species is closely related to *C. multiradiata*, but is comparatively slender and delicate, with much longer and much more slender cirri. The cirri are xii–xvi, 24–30, 25 mm. to 28 mm. long; the fifth and sixth segments are the longest, twice as long as broad; the tenth or eleventh and following are very slightly longer than broad, and sometimes bear two, a proximal and a distal, dorsal spines. The cirri taper slightly to the middle of the sixth (transition) segment, being more slender and highly polished from that point onward. The arms are from ten to thirty (usually between fifteen and twenty-five) in number, 110 mm. to 130 mm. long.

Type locality.—"Siboga" Station No. 320.

Comissia littoralis sp. nov.

The centrodorsal is discoidal, the dorsal pole flat, 2.5 mm. to 3 mm. in diameter.

The cirri are xxi–xxii, 16, 10 mm. to 11 mm. long; the first segment is short, the second about twice as broad as long, the third about half again as long as the proximal diameter, the fourth about twice as long as the proximal diameter or slightly longer, the fifth about as long as the fourth or slightly shorter; the following rapidly decrease in length, becoming after the eighth or ninth slightly broader than long; the fifth and following have a slight subterminal dorsal tubercle which gradually moves anteriorly, becoming median after the ninth; the opposing spine is very small, subterminal. The earlier longer segments are slightly constricted centrally with prominent ends; the distal shorter segments are laterally compressed and therefore appear broad. In general appearance the cirri resemble those of *Comanthus pinguis* or of *C. japonicus*.

The ends of the basal rays are visible as small tubercles in the angles of the calyx: very narrow subradial clefts are present; the radials are concealed; the I Br$_1$ are concealed except in the angles of the calyx, where their lateral edges diverge at an angle of 90°; the axillaries are almost triangular, twice as broad as long; the lateral edges are very short, making an obtuse angle with those of the I Br$_1$.

The ten arms are about 60 mm. long, and resemble those of *C. lütkeni*, but the basal swelling is only very slightly marked.

P$_1$ is considerably longer and stouter than the succeeding pinnules.

Type locality.—"Siboga" Station No. 129, reef.

Comissia parvula sp. nov.

This new species is closely related to *C. hispida*, but it is a smaller, more delicate and more slender form; the cirri while resembling in structure those of *C. hispida*, are arranged in two rows instead of in a single row on the centrodorsal, and are more slender and more numerous. From *C. chadwicki*, which also possesses the same type of centrodorsal and of cirrus structure, it differs in having fewer cirrus segments and a smaller centrodorsal on which the cirri are arranged in two rows instead of in a single irregular row.

The centrodorsal is large, discoidal, the dorsal pole flat, 2 mm. to 2.5 mm. in diameter.

The cirri are XX–XXIII, 9–13 (usually 11), 7 mm. to 9 mm. long.

The arms are 45 mm. long, and slender.

Type locality.—East Indies; collected by the "Siboga."

Comissia gracilipes sp. nov.

The centrodorsal is large, discoidal, with a broad flat dorsal pole 2 mm. in diameter. The cirrus sockets are arranged in a single very closely crowded marginal row.

In the type the cirri are XV, all lacking; in a smaller specimen the cirri are XX, in one and a partial second row, the latter apparently undergoing suppression; there are also traces of the sockets of a third row. In this latter the cirri have 9 segments and are from 4 mm. to 4.5 mm. long; the first segment is nearly or quite twice as broad as long, the second is slightly longer than broad, the third is about three times as long as the diameter of the proximal end, the fourth is slightly longer, and the fifth is about as long as the third; the sixth is about twice as long as the diameter of the distal end; the seventh is slightly shorter; the antepenultimate is half again as long as broad, and the penultimate is about as long as broad. The longer earlier segments are slightly constricted centrally with expanded ends as is usual in the genus. The dorsal processes on the outer segments are almost obsolete.

The ten arms resemble those of *C. parvula.*

Type locality.—"Siboga" Station No. 267.

Comissia spinosissima sp. nov.

The centrodorsal is large, thin discoidal, the dorsal pole flat, regularly pentagonal, 2 mm. in diameter.

The cirri are xxx, 10–11, 8 mm. long, small and slender, with rather strongly produced distal edges on the shorter outer segments; the first segment is very short, the second twice as long as the expanded ends, the third the longest, about four times as long as the median diameter; the fourth is nearly as long as the third, but the distal end is more expanded; the fifth is twice as long as the expanded distal end; the following gradually decrease in length so that the antepenultimate is about as long as broad; the second and third segments have both the proximal and distal ends considerably enlarged, and are slender and broadly oval in cross section; the fourth has the proximal end only very slightly enlarged, but gradually expands from the middle to the distal edge, which is produced and overlaps the base of the succeeding segment; the following segments gradually increase in lateral diameter, the enlargement of the distal ends gradually decreasing in extent; the fifth and following segments have slight subterminal tubercles; the opposing spine is terminal, minute, but larger than the tubercle on the preceding segment; the terminal claw is nearly twice as long as the penultimate segment, and is strongly curved.

The radials are concealed in the median line, but are slightly visible in the angles of the calyx; the I Br_1 is very short, oblong, five or six times as broad as long, very closely united with the succeeding axillary which is triangular, twice as broad as long.

The ten arms are 45 mm. long; the brachials resemble those of *C. hispida.* The ossicles of the division series and the brachials have their distal borders armed with very long fine spines; the pinnulars are exceedingly spinous, and the third has a slight, very spinous, carination.

Type locality.—"Siboga" Station No. 305.

Comatula tenuicirra sp. nov.

This form is closely related to *C. purpurea* from which it differs in possessing longer and more slender cirri.

In the type the cirri are x (in interradial pairs), 14–15, 13 mm. to 15 mm. long; the first segment is short, the second nearly as long as broad, the third one-third to one-half again as long as broad; the fourth and fifth are twice as long as the median diameter; the following segments become slightly shorter so that the third before the penultimate is about one-third longer than broad, the next slightly shorter, the antepenultimate half again as long as broad, and the penultimate very slightly longer than broad.

The ten arms resemble those of the slender armed variety of *C. purpurea* and measure 125 mm. in length.

The second and third segments of the lower pinnules are very strongly carinate.

Type locality.—"Siboga" Station No. 320.

Cominia australis sp. nov.

This species differs from *C. decameros* in having fewer cirri which have fewer segments and are very slightly stouter and less compressed laterally; the synarthrial and articular tubercles are not so prominent as in *C. decameros*, but the rugged character is indicated and might become prominent in larger specimens.

The centrodorsal is thin discoidal, the bare dorsal pole flat, 2 mm. in diameter; the cirrus sockets are arranged in three closely crowded roughly alternating marginal rows.

Cirri xxiv, 12–13, 13 mm. to 15 mm. long; the first segment is short, the second nearly or quite twice as broad as long, the third twice as long as the diameter of the ends; the fourth, fifth and sixth are about three times as long as their median diameter; the following gradually decrease in length so that the antepenultimate is about one-third longer than broad; the opposing spine is represented by a slight subterminal tubercle; the terminal claw is longer than the penultimate segment, rather stout, and moderately curved; the longer proximal cirrus segments have slightly swollen distal ends, this character gradually disappearing as the segments become shorter; the last four or five segments before the penultimate have the distal dorsal margin very slightly thickened; the cirri are moderately compressed laterally, this increasing slowly and evenly from the base to the short outer segments; the eighth or ninth segment becomes lighter in color distally and is a slightly marked transition segment, though the following segments are, like the preceding, without dorsal processes.

The post-radial series resemble those of *C. decameros*, but are not quite so rugged and tubercular. The ten arms were probably about 90 mm. long.

Type locality.—"Siboga" Station No. 297.

Comaster sibogæ sp. nov.

Comaster sibogæ is most nearly related to *C. fruticosus*, differing from that form chiefly in its proportionately longer and much more slender cirri which have proportionately longer proximal segments, and more prominent dorsal spines on the distal segments.

The cirri are XXII, 13, 13 mm. long; the first segment is short, the second is twice as long as its median diameter, the third about three times as long as its median diameter, the fourth and fifth the longest, three to three and one-half times as long as the median diameter; the following segments decrease rapidly in length, so that the antepenultimate is slightly longer than broad and the penultimate about as long as broad; the fifth is a transition segment; the following have small, but sharp and prominent, dorsal spines which are acutely triangular in end view; the opposing spine is subterminal, slender, and very sharp, in height equal to about one-third the lateral diameter of the penultimate segment; the terminal claw is nearly or quite twice as long as the penultimate segment, very slender and moderately curved basally, but becoming nearly straight in the outer two-thirds.

The arms are about sixty in number, 100 mm. long.

Type locality.—"Siboga" Station No. 318.

Comaster pulcher sp. nov.

The cirri are XXVII, 15–17, 12 mm. to 15 mm. long; the first segment is about twice as broad as long, the second about twice as long as the expanded distal ends, strongly constricted centrally, the third three or four times as long as the median diameter, constricted centrally, though not so much so as the preceding; the fourth segment is slightly over twice as long as the proximal diameter; the following rapidly decrease in length so that the seventh and following are about as long as broad; the fourth and following have small subterminal dorsal tubercles, and also have the distal edge everted and prominent so that in a lateral view they appear to bear dorsally a broad tubercle with a concave crest.

The thirty-seven arms are 85 mm. long; one of the II Br series is 2, the remaining nine being 4 (3+4); the III Br series are all 2; those which are absent are all external.

Type locality.—"Siboga" Station No. 257.

Comantheria weberi sp. nov.

This new species is most closely related to *C. imbricata;* but it is a more delicate and slender form with more numerous arms and much less robust and smaller cirri. It also lacks entirely on the division series, and almost entirely on the arms, the strong imbrication of the ossicles from which *imbricata* gets its name.

The centrodorsal is discoidal, moderately thick, the flat dorsal pole 4 mm. in diameter.

The cirri are XXXII, 19–20 (usually the latter), about 20 mm. long; the fifth and sixth or sixth and seventh segments are the longest, about half again as long as broad; the outer segments are nearly or quite twice as broad as long; the seventh or eighth (usually the latter) is a transition segment, strongly marked and encircled with a dark band; after the transition segment the distal dorsal edge of the segments begins to project, forming a serrate transverse ridge which on the outer segments becomes subterminal, remaining as a narrow serrate ridge which may be more or less raised in the center; on the fifth after the transition segment a small low tubercle appears midway between this ridge and the proximal end of the segment which on the outer segments becomes pointed so that in lateral view the dorsal surface of the segment is bidentate as in *Oligometra adeonæ*; the longer proximal segments are slightly constricted centrally with prominent ends; proximal to the transition segment the cirri are brownish yellow, distal to it white and highly polished.

The arms are forty in number, 95 mm. long; all the II Br series are 4 (3+4) and all the III Br series are 2; there is no division beyond the III Br series. The division series are moderately broad and well rounded dorsally, moderately separated; the dorsal interradial perisome contains small scattered inconspicuous plates; the brachials are moderately overlapping.

Type locality.—"Siboga" Station No. 49*a*.

Comantheria rotula sp. nov.

This form is intermediate between *C. briareus* and *C. weberi*; it exhibits the post-radial structure of the latter, but possesses the centrodorsal and cirri of the former.

The centrodorsal is greatly reduced, usually with a few weak cirri, though there may be none.

The arms are forty in number, in the type 150 mm. long; the II Br series are 4 (3+4) and the III Br series 2; there is no further division. The dorsal surface of the animal is smooth, with comparatively little overlap to the brachials, and the rugged appearance characteristic of *briareus* is entirely absent.

Type locality.—"Siboga" Station No. 273.

Comanthus crassicirra sp. nov.

This species is related to *C. japonica*, and is the first member of the small group to which *C. japonica* belongs to be brought to light south of Japan.

The centrodorsal is flattened hemispherical, the small dorsal pole flat, 2 mm. in diameter; the cirrus sockets are arranged in one and a partial second irregular marginal row.

The cirri are XVII, 22–24, 24 mm. long; the first segment is short, the following gradually increasing in length so that the fourth is nearly or quite as long as broad and the fifth and sixth or sixth and seventh, which are the longest, nearly or quite half again as long as broad; the following segments gradually decrease in length so that the terminal eight or ten are slightly broader than long; the twelfth or thirteenth and following have small subterminal dorsal tubercles; the shorter distal segments are slightly compressed laterally and have a highly polished surface, though this begins gradually so that there is no marked transition segment; the opposing spine is small, low and broad, median or subterminal. As a whole the cirri are large, long and stout, resembling those of *C. japonica*.

The radials are just visible in the median line beyond the centrodorsal, but extend well up in the angles of the calyx, their distal ends being slightly separated so that the bases of the I Br_1 are not in apposition; the I Br_1 are short with a convex proximal border and slightly converging lateral edges; they are about three times as broad as the median length; the axillaries are broadly pentagonal, twice as broad as long, the anterior angle sharp, and the distal edges concave; the lateral edges are about as long as those of the I Br_1 and make with them an obtuse angle.

There are three II Br and four III Br series present; three of the latter are internal, the fourth being developed by the side of an internal one. The division series are narrow so that a large amount of dorsal perisome is visible; this is protected with numerous small irregular plates.

The seventeen arms are 120 mm. long, and resemble those of *C. japonicus*.

Type locality.—"Siboga" Station No. 133.

FAMILY ZYGOMETRIDÆ.

Zygometra punctata sp. nov.

The centrodorsal is thin discoidal, the broad dorsal pole flat, circular, 2.7 mm. in diameter.

The cirri are XV, 18–19, 9 mm. long; the first segment is very short, the second and third about three times as broad as long, the fourth about twice as broad as long; the next two or three are similar to the fourth; the following decrease very gradually in length so that the distal ten or eleven are slightly broader than long; the sixth and following bear prominent sharp dorsal spines.

The radials are entirely concealed by the centrodorsal; the I Br_1 are very short and band-like, six or more times as broad as long, united to the axillary by pseudosyzygy; the axillaries are low triangular, the lateral angles slightly truncated, three times as broad as long.

The II Br series are 4 (3+4), broad like the I Br series, with straight lateral edges which are more or less flattened and are almost or quite in apposition; the lateral portions of the dorsal surface of the ossicles of the division series are roughened or very finely papillose as in the species of *Mariametra*.

The type has twenty-one comparatively short and rather stout arms 35 mm. long.

P_1 is about 5 mm. long, rather stout basally but tapering in the distal half to a slender flagellate tip, with twenty segments of which the first is about three times as broad as long and the following gradually increase in length becoming about as long as broad on the ninth and slightly longer than broad terminally; the proximal segments are rather strongly carinate, the carination having a straight profile parallel to their longitudinal axes; the outer segments have slightly prominent distal ends. P_2 is similar to P_1, but just perceptibly smaller and shorter. P_3 is 2.5 mm. long with twelve segments, resembling, except for its small size, the preceding. P_4 is 2 mm. long with twelve segments of which the first three are much broader than long, the fourth is about as long as broad, and the distal twice as long as broad. P_5 is 2.5 mm. long with twelve segments and resembles P_4, but is very slightly stouter basally and possesses longer segments distally; the following pinnules resemble P_5. The distal pinnules are 4 mm. long with fifteen segments of which the distal are nearly or quite three times as long as broad.

The color is white or brownish white with numerous regular purple spots on the division series and arm bases, and in band-like areas on the outer part of the arms; the cirri are white, with each segment banded with purple.

Type locality.—"Siboga" Station No. 273.

Eudiocrinus junceus sp. nov.

The centrodorsal is discoidal, moderately thick, the sides sloping inward rather strongly; the flat dorsal pole is 1 mm. to 1.5 mm. in diameter; the cirrus sockets are arranged in two closely crowded and irregular rows.

The cirri are xxv, 22, 23 mm. long, greatly elongated with elongated segments, very slender, tapering from the base to the tip, rather more in the first three or four segments than subsequently. The first segment is short, the second not so long as broad, the third nearly or quite twice as long as the proximal diameter, the fourth about four times as long as the median diameter, the sixth, seventh and eighth very slightly longer; from this point the length almost imperceptibly decreases so that the seventeenth and following are slightly over twice as long as broad; the penultimate is half again as long as broad and tapers somewhat distally; the opposing spine is represented by a small, rounded subterminal tubercle; the terminal claw is slightly longer than the penultimate segment, very slender and very sharp, only slightly curved. The second and third segments are rather strongly constricted centrally, and the sixth and following have moderately expanded and slightly overlapping distal ends; both of these characters gradually die away distally. The cirri are rather strongly compressed laterally from the fifth segment onward.

The radials are just visible beyond the edge of the centrodorsal; their distal border is swollen and turned outward, smooth or evenly tuberculated. The ossicles of the I Br series (which are united in a pseudosyzygial pair) taken together are oblong, not quite twice as broad as long; both the proximal and the distal borders are turned outward, the former slightly, but the latter standing up at right angles to the general surface of the segment, with a smooth and somewhat thickened edge; the proximal edge may be more or less scalloped, and bears just within the border a prominent rounded tubercle; the produced distal edge is thickest and most prominent in the mid-dorsal half, this portion being distally evenly concave; the remainder of the distal edge may be broadly scalloped.

The five arms are 90 mm. long; the first brachial is oblong, two and one-half to three times as broad as long, the proximal and distal edges slightly thickened and everted; the second brachial is similar, but the distal edge is prominently everted, especially in the central third where the eversion is thickened and distally concave, standing up vertically from the dorsal surface of the segment; the third and fourth brachials form a syzygial pair which is slightly longer on one side than on the other, and is about twice as broad as the lesser length; this syzygial pair resembles the primibrachial pseudosyzygial pair, but the tubercle just within the proximal border is only barely indicated; the following three brachials are slightly wedge-shaped, about twice as broad as the median length, with their distal borders everted as described for the second brachial, but progressively less and less so; the following brachials are triangular, about as long as broad, with slightly produced and overlapping distal edges. From the fourth to the ninth brachials there is a low median carination which after the ninth becomes the low rounded zigzag keel characteristic of the arms of all the species of this genus, which is traceable throughout the entire length of the arms.

P_C is 6.5 mm. long with fifteen segments, rather stout basally, but tapering rapidly to a very delicate tip, strongly prismatic; the first segment is much broader than long, the following gradually increase in length becoming about as long as broad on the fourth or fifth and terminally twice as long as broad; the second to the sixth segments have a narrow sharp carination, the crest of which is straight and parallel to the longitudinal axis of the pinnule; the outer edge of the prism formed by the pinnule is sharp; the outer surface of the pinnulars between the prismatic angles is flat or very slightly concave; P_1 is similar, 6.5 mm. long with thirteen or fourteen segments; P_a is 11 mm. long with fifteen segments, much larger and stouter than the preceding, tapering evenly from the base and becoming very delicate distally; the first segment is much broader than long, the following gradually increasing in length and becoming about as long as broad on the fourth, and three times as long as broad terminally; the second, third and fourth have a low even carination; the second and following have their distal edges all around produced and finely spinous; P_2 is 11 mm. long with fifteen segments, exactly resembling P_a ; P_b is from 8 mm. to 10 mm. long with nineteen segments, of which the basal are as small as the basal segments of P_2; the first segment is short, more or less crescentic, the second is about twice as broad as the median length, the third is not quite so long as the distal breadth, the fourth is from one-third to one-half again as long as broad, and the following gradually increase in length, after the eighth being three or four times as long as broad; the fifth and following have slightly produced and spinous distal edges; P_3 is 10 mm. or 11 mm. long, similar to P_b ; P_c is 8 mm. long with seventeen segments, very slender (more slender than P_b) with more elongated segments than P_b ; P_4 is similar to P_c ; P_d is 7 mm. long with eighteen segments, resembling P_c, but even more delicate, with longer segments; P_5 is similar to P_d ; P_e is 6.5 mm. long, with sixteen segments, and resembles P_d ; P_6 is similar to P_e ; the distal pinnules are 8.5 mm. long, with twenty segments, and are excessively slender.

Type locality.—"Siboga" Station No. 167.

Eudiocrinus pinnatus sp. nov.

The centrodorsal is discoidal, the flat dorsal pole 2 mm. in diameter; the cirrus sockets are arranged in two marginal rows.

The cirri are xvii, 17–22, 10 mm. to 11 mm. long; all the segments beyond the third are subequal, none being quite so long as broad; the fourth to the eighth or ninth have slightly prominent distal edges, especially dorsally. The cirri are rather stout and are of the same type as those of *E. variegatus*.

The five arms are about 75 mm. long; the brachials are unornamented, and their distal edges are not produced.

P_C is 4 mm. long, with eleven segments, moderately stout, strongly prismatic, evenly tapering to the tip, the distal border of the segments sharply, though narrowly, carinate; P_1 is 4.5 mm. long, with twelve segments, similar to P_C; P_a is 11 mm. long, with seventeen segments, very slender like the succeeding pinnules, though very stiff; the first two segments are slightly broader than long, the third and fourth half again as long as broad, the following gradually increasing in length and becoming distally three or four times as long as broad; the distal edges of the third and following segments are produced and spinous; the pinnule resembles the lower pinnules in certain of the more slender species of *Colobometra*; P_1 is similar to P_a, 11 mm. long, with seventeen segments; P_b is similar to P_3, 8 mm. long, with eighteen segments; P_3 is 8 mm. long, with eighteen segments, proportionately more slender than P_2 and with much shorter segments which become as long as broad on the third and twice as long as broad basally on the tenth or eleventh; P_c and P_4 are 7.5 mm. long, with eighteen segments, and resemble the preceding pinnules; the distal pinnules are 12 mm. long, with from twenty to twenty-four segments which, beyond the fifth, are twice, and distally are three times as long as broad, with very finely spinous distal ends.

Type locality.—"Siboga" Station No. 310.

Eudiocrinus venustulus sp. nov.

The centrodorsal is thin discoidal, the bare dorsal pole flat, finely papillose, 1 mm. in diameter; the cirrus sockets are arranged in a single marginal row.

The cirri are xii, 15–16, 6.5 mm. long, rather slender; the first segment is short, the second longer, the third about as long as the median diameter; the fifth and sixth are the longest, about as long as their distal diameter or slightly longer; the segments after the eighth are subequal, slightly longer than broad; the third to the seventh segments are constricted centrally with strongly expanded distal ends which overlap the bases of the succeeding segments, especially dorsally; beyond the seventh this character gradually dies away.

The distal edge of the radials is just visible beyond the edge of the centrodorsal, and is ornamented with a row of small regular tubercles; the pseudosyzygial pair (the ossicles of the I Br series) is oblong, not quite twice as broad as long, with the proximal, distal and lateral edges everted; the lateral edges are beaded like the distal edge of the radials; the proximal edge is faintly scalloped and bears a prominent median tubercle; the distal edge has the median third of the eversion thickened and standing up vertically as a high transverse ridge; the pseudosyzygial line is finely beaded; the first brachial is oblong, about three times as broad as long; the proximal edge is slightly everted, with a prominent, though small, median tubercle; the distal edge is strongly everted and thickened, this thickened and everted border being more or less divided in the middle; the second brachial is very slightly larger than the first, about twice as broad as long; the distal edge is everted, the central third of this eversion being thickened and produced; the first syzygial pair (composed of the third and fourth brachials) is about as long as broad or slightly longer than broad; the proximal edge is slightly everted with a minute median tubercle; the distal edge is slightly everted with a slightly larger, more or less transversely elongate, median tubercle; the following brachials have finely spinous distal ends which are not produced nor everted; a slight median tubercle is visible on the proximal border of the brachials up to the first or second beyond the second syzygy; there is a very low and faint median carination on the syzygial pair and on the following brachials which is accentuated by being light in color bordered with dark on either side; on the triangular brachials this becomes zigzag as in the other species of the genus.

The five arms are 60 mm. long.

P_C is 3 mm. long with ten segments; the first bears a very large fan-shaped, rounded or distally truncated carinate process which is about as high as the lateral diameter of the segment; the second bears a high carinate process half as high as the lateral diameter of the segment, of which the crest is parallel to the longitudinal axis of the pinnule; the following segments are similarly, but diminishingly, carinate; P_1 is similar; P_a is 5 mm. long with eleven or twelve segments, of which the first is short, the second is nearly as long as broad, the third is about as long as broad, and the distal are twice as long as broad; the pinnule is rather slender and not greatly enlarged, rather strongly prismatic; the distal edges of the third and following segments are slightly produced and finely spinous, with prominent spines at the angles of the prism; the ventral borders of the segments bear very numerous fine spines; the first segment has a strongly rounded carinate process, and the second and third are narrowly though sharply carinate; P_2 is similar to P_a; P_b is 4 mm. long with thirteen segments, slightly more slender than P_a; the first segment is short, the second slightly longer, the third about as long as broad; the distal segments are much elongated with a few long spines on the distal edges which are turned outward; the proximal segments are not carinate; the following pinnules are similar, though weaker and more slender with slightly longer segments distally which bear a few conspicuous spines on their overlapping distal ends; the distal pinnules are exceedingly slender, 7 mm. long with seventeen segments, of which the third and following are greatly elongated; the third bears a narrow carination.

Type locality.—"Siboga" Station No. 289.

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A NEW SPECIES OF DERMACENTOR AND NOTES ON OTHER NORTH AMERICAN IXODIDÆ.

BY F. C. BISHOPP.

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In connection with the work conducted by the Bureau of Entomology in determining the distribution of the Rocky Mountain spotted-fever tick, *Dermacentor venustus*, a large amount of interesting material has been accumulated. Among the thousands of specimens of ticks sent in by agents of the Bureau and several hundred correspondents throughout the western United States, but two new forms were discovered, one of these a new variety (*rugosus*) of *Ixodes cookei*, has been previously described by the author; the other, a new species of *Dermacentor*, is described herein. Specimens of an *Ixodes*, recently described as *I. kingi*, were also collected. Representatives of this form were, however, in the National Museum before the investigation of the spotted-fever tick began.

It seems surprising that more undescribed ticks were not found among this large amount of material from a region which has not been carefully worked over especially with reference to its tick fauna. A total of about 1500 lots of ticks were collected in 225 localities in the Rocky Mountain and Pacific States. It should be noted, however, that the majority of the specimens were taken on domestic animals. Systematic collecting of the wild animals and birds throughout this region would no doubt reveal the presence of many more new forms.

It is thought best to publish occasional short articles containing certain systematic and biologic notes such as are here presented rather than to accumulate this information to be used in connection with results of life history studies.

I desire to thank Mr. W. D. Hunter for the interest he has shown in my work, and to gratefully acknowledge the assistance of Mr. J. F. Strauss, to whom I am indebted for the illustrations herewith presented.

Ixodes diversifossus Neum.

Prior to the collection of a number of specimens of *Ixodes diversifossus* by Mr. Vernon Bailey on September 2, 1909, in the Bitter Root Valley, near Hamilton, Montana, but two females of this species were known. The above mentioned collection contained 7 ♂, 16 ♀ and 2 nymphs, one partially and one fully engorged, taken on a cotton-tail rabbit, *Sylvilagus nuttalli*.

None of the females deposited eggs although some lived for a considerable length of time. One of the more engorged specimens being alive after seven months. The fully engorged nymph molted to a female 39 days after the date of collection.

The male of this species has not been described heretofore.

Male.—Capitulum (Figs. 8, 10, 11): length, 402μ (from tip of hypostome to tips of postero-lateral angles); basis capituli very dark reddish brown, darkest around edges; greatest width (251μ) at base of palpi; postero-lateral angles pronounced, rather acute, slightly incurved so that the width between their centers is about 187μ: dorsal edge straight; ventrally basis capituli with an angular tubercle (not a spine as in the female) below the base of each palpus; palpi short and rather broad, 294 to 316μ in length; slightly impressed on dorsal side near inner edge; hypostome short, stout, with four files of teeth, two teeth at base ventrally very large, basal teeth of lateral files also large; tip of hypostome slightly lobed at apex; chelicerae large, about 172μ long; external article with five teeth, basal one very stout.

Scutum 1.31 mm. long by .68 mm. wide to 1.39 mm. long by .65 mm. wide, reddish brown; pseudo-scutum darker and slightly raised; capitular emargination not deep, scapular angles short and blunt; cervical grooves short, rather deep, first converging, then diverging posteriorly and ending abruptly opposite space between coxae II and III; scutum punctate, on pseudo-scutum punctures very small and scattered, punctures large and less scattered behind pseudo-scutum in middle.

Legs (Figs. 7, 10) fairly long and stout, yellowish brown; all tarsi tapering to tips, tarsi I 351 to 387μ in length; coxae I with a long sharp basal spine, II and III bear a suggestion of basal tubercles, IV with no basal prominence; coxae I with a small apical tubercle, II, III and IV with short, broad apical spines, shortest on IV; long yellowish hairs on all coxae and on legs.

Stigmal plates nearly circular, about 151μ in diameter; goblets of medium size, about five rows at widest and one row at narrowed point between macula and marginal cells; macula nearly circular, slightly elevated.

Body (Fig. 10) elongate-oval, marginal strip yellowish brown, punctate and bearing numerous long pale hairs; venter, pregenital plate nearly rectangular with rather large punctures; median plate fully twice as long as broad, sparsely covered with small punctures and long yellowish hairs; anal plate in form of truncate cone, height but little greater than width of base, sides slightly convex, with a few small punctures; adanal plate longer than width along median plate, which is greater than width along posterior margin, bearing a very few shallow punctures and long hairs; lateral plates sparsely punctate, punctures medad of stigmal plates very large; scattered large punctures between coxae and ventral plates.

As the original description of this species by Prof. Neumann and the description by Mr. Banks were based upon but two females, and these mutilated, a few additional descriptive notes on the female are here presented. The species is easily identified, however, by either of the above mentioned descriptions.

Female.—Capitulum (Figs. 9, 12): length from 717 to 731μ (from tip on hypostome to a line drawn between tip of postero-lateral angles); basis capituli 416 to 438μ wide, smooth dorsally; ventrally, with two stout sharp spines, 64 to 86μ in length, curved ventro-posteriorly; porose areas shallow and quite uniform in shape in all specimens; palpi 567 to 603μ in length; hypostome long, moderately stout and fairly acute at apex; two files of teeth on basal half, three files apically and four files near tip.

Scutum from 1 mm. long by .947 mm. wide to 1.2 mm. long by .938 mm. wide, dark reddish brown in unfed specimens, almost black in some fed individuals; the punctures are quite similar in all specimens, very small and sometimes almost absent anteriorly, rather large and more numerous toward tip; with long, yellowish, scattered hairs; lateral carinae distinct but rounded, running to margin of scutum at its posterior fourth; cervical grooves distinct, first converging, then diverging widely and disappearing near lateral carinae behind the middle of the scutum.

Legs very dark reddish brown, lighter in unfed specimens; a considerable number of long pale hairs on legs and coxae; length of tarsi I 560 to 574μ; length of metatarsi I 287 to 330μ.

Stigmal plates small (not large as stated by others), from 237 x 172μ to 215 x 172μ; transversely oval; 74 to 87 goblets, of medium size, to each plate, set close together; four rows of goblets at widest and one row at narrowest point between macula and marginal cells; macula near the center of plate dorso-ventrally but much nearer the anterior than the posterior side.

Body, margin on dorsum more hairy than scutum and lighter colored; a considerable number of long pale hairs on venter.

The single unfed female in hand measures 1.74 mm. long (from scapular angles to posterior tip of body) by 1.21 mm. wide. The partially engorged females are elongate and are much darker in color than the unfed one.

Material in Bureau of Entomology collection in Washington, D. C., and at Dallas laboratory under Dallas Acc. No. 683.

As Banks has pointed out (Rev. of Ixodoidea, 1908, p. 27) Neumann's *I. bicornis* is very close to this species if not identical with it. The larger scutum of *bicornis* and the greater length of article II as compared with article III of the palpi, the larger external spine in coxae I, and the three files of teeth on the base of the hypostome (in ***diversifossus*** there are two files at base, three in middle and four at tip of hypostome) indicate that ***bicornis*** may be entitled to varietal rank. The discovery of the male of ***bicornis*** would undoubtedly aid materially in determining the proper standing of this species.

The dentition of the hypostome of the male of ***diversifossus*** is of a type similar to that of *I. ricinus*. The dentition of the hypostome in both sexes, the great length of tarsi I as compared with metatarsi I, the oval scutum of the female and other points, suggest a relationship to the *ricinus* group.

Ixodes texanus Banks.

Until recently but two lots of specimens of this species had been collected, other than the type material. One of these lots, as recorded by Nuttall and Warburton, was collected by V. L. Kellogg on gray squirrel, July, 1896, at King's River, Calif. The other is a single well engorged female in Mr. Banks' collection. This specimen was taken on ***Mustela** pennanti* at Trout Lake, Wash., March 8, 1901. Nuttall and Warburton also record a collection consisting of a single female taken on ***Procyon lotor*** at Mt. Lehman, B. C., by Dr. S. Hadwen during January, 1910. During the past two years, however, the agents of the Bureau of Entomology have collected a considerable amount of material, thus adding much to our knowledge of the distribution, hosts and seasonal occurrence of this species. The collection from which the type material was selected consisted of 9 ♀, unengorged to one-fourth engorged, and a few larvae, taken on raccoon at Oakville, Texas, November 30, 1908, by Mitchell and Bishopp. In south Texas, Messrs. F. C. Pratt and C. T. Atkinson, during 1910, made collections of this species as follows: 9 ♀ on raccoon, Sabinal, February 4; 1 ♀ on squirrel, Sabinal, April 5; 1 ♀ on civit cat, Utopia, September 11; 7 ♀, 24 nymphs, on raccoon, Sabinal, November 12. In the Bitter Root Valley of Montana near Florence, Messrs. W. V. King and C. Birdseye have collected a considerable amount of material. During 1910 the following collections were made in that vicinity: 2 ♀ on marten (*Mustela c. origenes*), March 13; 3 ♀ on weasel (***Putorius arizonensis***), June 16; 2 ♀, 11 larvae on pine squirrel (***Sciurus h. richardsoni***), July 16; 2 ♀, 6 nymphs and some larvae on pine squirrel, July 16; 16 ♀, 1 nymph, 19 larvae, on pine squirrel, August 16. During 1911 the following collections were made: 3 ♀ on marten, Lo Lo Hot Springs, Mont., March; 23 ♀, 13 nymphs on pine squirrel, Florence, Mont., July 26; 3 ♀, 8 nymphs on pine squirrel, Florence, Mont., August 20. Mr. C. Birdseye obtained 2 females (one-half and one-third engorged) which were collected January 18, 1912, on a marten near Woodman, Mont.

It is worthy of note that no males were taken although 61 females, in all stages of engorgement, were collected. Females were taken upon hosts during every month of the year except May, October and December. The immature stages, however, were taken on hosts from July to November only.

A few notes have been made on the type specimens. Width of basis capituli, 541μ; length of palpi, 467μ. The porose areas are not well defined, being surrounded by the roughened surface of the basis capituli; the palpi are also roughened dorsally. The stigmal plates are broadly oval, the greatest length at right angles to the axis of the body. They measure about 196 x 152μ. The goblets are rather large, apparently three rows at widest and one row at narrowest point between macula and marginal cells. Among the paratypes the width of the basis capituli ranges from 488 to 517μ and the length of the capitulum from 646 to 717μ. In general the paratypes agree closely with the type; some, however, have the shield rugose over nearly the entire surface.

The specimens studied show a considerable variation in certain points. The size of individuals even from the same locality varies much. The ticks from the Northwest usually have larger porose areas than are exhibited by material from Texas. The porose areas in some of the specimens from Washington and Montana are not more than one-half as long as broad. All specimens show rugosity on the scutum and basis capituli though the extent of roughness varies considerably. The length of the capitulum in the series studied has been found to vary from 459 to 717μ and its width from 373 to 541μ. The length of tarsi I varies from 402 to 631μ and tarsi IV from 373 to 680μ. The stigmal plates range from 222 x 301 to 125 x 143μ.

Dermacentor hunteri sp. nov.

Male (Fig. 1).—Length, not including capitulum, 4.42 mm.; width, 2.98 mm.

Capitulum (Figs. 1, 3): length, 875μ (from tip of hypostome to end of postero-lateral angles); basis capituli reddish brown with considerable white on dorsal surface; sides about parallel; width, 560μ; postero-lateral angles long (shorter than in *D. occidentalis*); ventrally, basis capituli is quite narrow and slightly roughened along posterior border; length of palpi (dorsally), 474μ; extreme length of article II (dorsally), 244μ; of article III, 201μ; some white on basal portions of articles II and III, also a few pits and short hairs; article I prominent ventrally; bearing fine bristles along its internal edge, article II has six such bristles and article III one bristle; hypostome very broad at apex, narrowed toward base; three rows of rounded teeth on either side, nine large teeth per row, smaller teeth toward base where the three rows converge, the teeth gradually becoming smaller until they disappear at base; chelicerae rather small; length of internal article 130μ, with a small external subterminal tooth, and an internal subterminal ridge; dorsal process with two small teeth; external article with a large basal tooth, a smaller tooth toward the apex and apparently two minute apical teeth.

Scutum (Fig. 1) dark reddish brown with an extensive white pattern; oval, slightly constricted at eyes; capitular emargination moderately deep; scapular angles narrowly rounded; cervical grooves distinct, but not deep, first converging then diverging posteriorly, not reaching to edge of pseudo-scutum; marginal groove shallow, marked by a row of large punctures, a very few rather small punctures elsewhere on scutum; festoons prominent; pseudo-scutum outlined with a broad white band, white between cervical grooves, more broken on postero-median part of pseudo-scutum; two submarginal stripes running from pseudo-scutum to third festoon on either side, these are joined to an interrupted marginal band which becomes continuous, though narrow, posteriorly, running around entire posterior margin of festoons; two submedian stripes run backward from pseudo-scutum, these diverge posteriorly and join the submarginal stripes at the first festoon, they are also connected with the submarginal stripe anteriorly; two submedian loops of white extend from the point where the submedian stripes begin to diverge to the fifth and seventh festoons; all white markings are interrupted by numerous small red points.

Legs (Figs. 1, 4) dark reddish brown with much white dorsally, tarsi with but a trace of white; coxae and basal joints of legs with numerous rather short pale hairs; coxae I with internal spur slightly longer than external; coxae II and III with inner posterior angles upturned; apical spines on coxae II, III and IV about equal in length, those on coxae IV slightly more slender than on any of others; trochanter I rather long, much enlarged distally, forming a postero-ventral knob, produced antero-dorsally into a broad sharp spur; trochanter II less enlarged distally, III not noticeably enlarged and IV with a slight flaring internal rim; femur IV with a long sharp anterior projection at its articulation with the trochanter, also a shorter less sharp posterior prominence; narrowed toward articulation with trochanter, this narrowed portion of femur 144μ long, total length 1.088 mm.; femora with five ventral teeth, three of these small, apical one long and sharp; length of tibia 932μ, with two rows of ventral teeth, three moderately sharp teeth in anterior row and four less sharp ones in posterior row; metatarsi 775μ long, with four rather blunt teeth ventrally, two along the median line near the middle of the segment and two opposite each other at its distal end; tarsi IV 731μ long, tapering to tip, with a subapical ventral spur and a long recurved apical spine; pulvilli elongate oval; total length of pulvilli IV 273μ; claws long and slender.

Stigmal plates (Fig. 5) oval with a very long narrow postero-dorsal prolongation; greatest dimension from antero-ventral angle to extreme tip of prolongation 617μ; entire plate narrowed toward the prolongation; the chitinized margin is wide, especially along the external lateral angle and near the tip of the prolongation where the margin widens to form a small boss; goblets rather large, widely separated, covering most of the surface except on the prolongation, about 41 per plate; the supporting cells are rather large around each goblet and around the margin of the plate where they form a scalloped border, bending slightly outward opposite each goblet; the supporting cells extend out on the prolongation in a very narrow strip; the sides of this cellular area are nearly parallel; macula ovate, broadest anteriorly, about 215μ long; aperture elongate, slightly curved.

Body, genital pore situated between coxae II, genital groove moderately distinct; anus broadly oval, transverse, about 215 x 187μ, soft portions of venter transversely striate, with numerous short pale hairs.

Female.—Capitulum (Fig. 2) 832μ in length; basis capituli dark reddish brown, with considerable white on dorsal surface; 588μ wide; postero-lateral angles moderately long; porose areas broadly elliptical, oblique, rather close together at base; ventrally, basis capituli is rather long and narrowed at posterior ridge, which is prominent; palpi 488μ in length; article II 301μ in length along internal margin, article III 172μ along internal margin; article I prominent ventrally, bearing four bristles along internal edge, article II with seven such bristles, and article III with three bristles; hypostome broad at tip narrowed proximally, with six rows of teeth ventrally; the three rows of teeth on either side converge toward base and diverge from the median line, the outer row is the longest having about thirteen teeth; internal article of chelicerae 151μ long, slender, with small external subterminal tooth, basal tooth on external article large.

Scutum (Fig. 2) 1.71 mm. long, 1.53 mm. wide, widest at eyes which are moderately prominent, margin posteriorly is almost a regular curve, there being no marked constriction behind eyes; capitular emargination rather deep, scapular angles narrow but rounded; cervical grooves rather deep anteriorly, converging, then diverging posteriorly, the divergent portion very shallow, and disappearing one-third of the length of the scutum from its posterior tip; most of surface of scutum covered with white which has a distinct greenish metallic lustre; red streaks along cervical grooves, on scapular angles and around eyes, white is somewhat broken with red on anterior portion between cervical grooves; rather numerous small red points or minute punctures scattered over entire scutum, a few somewhat larger punctures on scapular angles.

Legs and coxae dark reddish brown, a strip of white along the dorsal sides of legs except on tarsi; scattering pale hairs on coxae and legs; coxae I with long spurs, internal slightly longer than external; coxae II and III with postero-internal angles slightly raised from body; coxae II, III and IV with long, stout apical spines, trochanter I with short but rather sharp subterminal dorsal prolongation; all tarsi tapering at tips.

Stigmal plates (Fig. 6) of medium size, greatest dimension 502μ, from anterior internal angle to tip of prolongation; broadly oval with a rather long postero-dorsal prolongation extending at about right angles to a line through the macula; plate with a highly chitinized slightly raised border, widest in the external lateral angle where the border widens into a boss near the tip of the prolongation and rather below the general surface of the plate; goblets rather large, 50 per plate, scattered over surface except in the prolongation; supporting cells larger around goblets and around margin of plate where they form a scalloped border, being slightly bulged opposite each marginal goblet; macula oval about 208μ long, aperture elongate.

Body dark reddish brown; marginal groove and festoons prominent; postero-median and accessory grooves distinct, of about equal length, reaching nearly to foveae, a number of short pale hairs ventrally; genital aperture opposite the space between coxae II and III, genital groove distinct; anus transversely oval, about 230 by 194μ.

Type Cat. No. 14575, U. S. National Museum.

Type host.—Mountain sheep (*Ovis mexicanus* Merriam).

Type locality.—Quartzsite, Arizona.

A male and a female described from a lot of 23 males and 12 females taken on a female mountain sheep September 2, 1911, by Mr. George Hutson. The type female after being described was darkened considerable and the white made less intense by boiling dry during the process of softening it. Paratypes in Bureau of Entomology collection at Washington, D. C., and at Dallas, Texas, under Dallas acc. No. 2352.

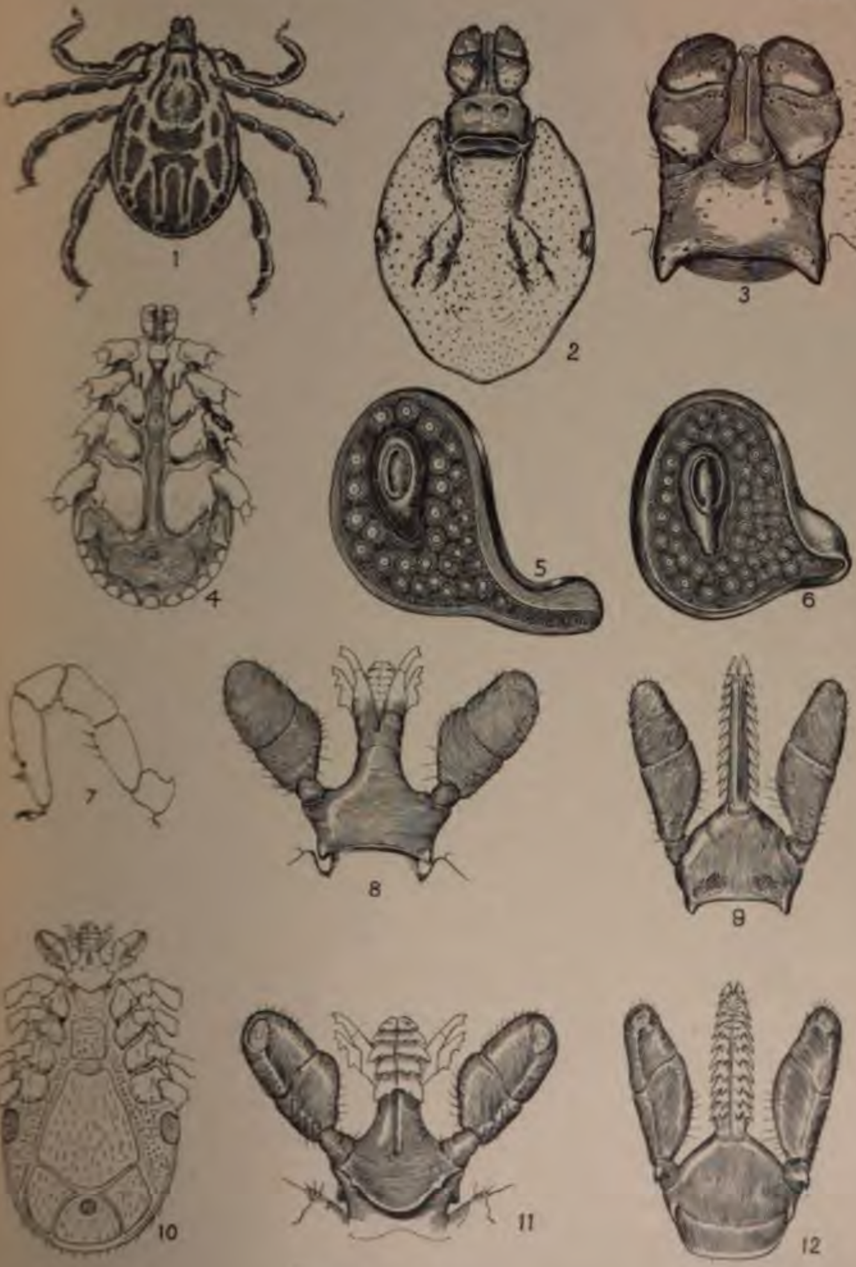
I take pleasure in naming this pretty Dermacentor in honor of my associate, Mr. W. D. Hunter.

Mr. Hutson made a special effort to secure an abundance of material of this species and it is to him that I am indebted for the following records of collections: 3 ♂ (a dozen or more were collected but not sent in as they were dead), July 8, 1910; 16 ♂, 1 ♀ (unengorged), August 10, 1910; 5 ♂, 2 ♀ (unengorged to $\frac{1}{20}$ engorged), August 20, 1910; 18 ♂, 13 ♀ (unengorged to fully engorged), December 1, 1910; 23 ♂, 12 ♀ (unengorged to $\frac{1}{20}$ engorged), September 2, 1911. Several specimens, mostly males, escaped when the last collection was made. All of these lots were collected on mountain sheep near Quartzsite, Arizona, at an altitude of from 1500 to 2000 feet.

All specimens collected agree closely with the types; the males are all of good size and the color markings quite uniform. The number of goblets on the male stigmal plates varies from 31 to 45 and on the female plates from 34 to 50.

The species runs to *D. venustus* in Mr. Banks' table. It appears to be most closely related to *venustus* but is easily distinguished from that species by many characters, some of which are the much smaller number of goblets on the stigmal plates; stigmal plates not so broad near their posterior ends and in the male with more narrow and longer prolongations; the scutum in each sex with much fewer large punctures, and the white marking are quite different; in the female the scutum is much less constricted behind the eyes; the porose areas are not pointed anteriorly; postero-lateral angles of basis capituii are longer; the dorsal portion of trochanter I is produced into a moderately sharp angle, not broadly rounded as in *venustus*.

The largest female collected measured 12.9 x 7.5 x 4.2 mm., length



EXPLANATION OF PLATE.

Dermacentor hunteri.—Fig. 1, dorsum of male; Fig. 2, scutum and capitulum of female; Fig. 3, capitulum of male; Fig. 4, venter of male; Fig. 5, stigmal plate of male; Fig. 6, stigmal plate of female.

Ixodes diversifossus.—Fig. 7, fore leg of male; Fig. 8, capitulum of male, dorsal; Fig. 9, capitulum of female, dorsal; Fig. 10, venter of male; Fig. 11, capitulum of male, ventral; Fig. 12, capitulum of female, ventral.

Drawn by J. F. Strauss. (Original.)

including palpi in normal position. A female engorged to repletion on a guinea pig measured 11.2 x 6.3 x 4.0 mm., length including palpi.

The larvæ and nymphs drop from the host for molting. Notes on the life history of the species and descriptions of the immature stages will be published later.

Amblyomma maculatum Koch.

In examining a number of collections of immature specimens of ticks, several lots of *Amblyomma maculatum* were found. Previously these had been confused with *Aponomma inornata* Banks, but they are quite easily distinguished in the nymphal stage, from that species, by two prominent spines on the ventral side of the basis capituli. These spines point backward and are located near the posterior margin of the basis capituli behind the base of the palpi. The palpi are longer and more slender than in *Aponomma inornata*, article II being much narrowed basally and article I not bearing the internal prolongation found in that species. The lateral angles on the dorsal side of the basis capituli are sharp while in *inornata* they are rounded.

In the material examined the following lots were found: 1 nymph on meadowlark (*Sturnella magna*), December 16, 1908; 1 nymph on one, 2 on another and 3 on still another meadowlark, January 5, 1909; 5 nymphs on meadowlark, January 26, 1909; 1 nymph on meadowlark, January 27, 1909; 2 nymphs on red-winged blackbird (*Agelaius phoeniceus*), January 28, 1909; 1 nymph on Brewer's blackbird (*Euphagus cyanocephalus*), January 6, 1909; 1 nymph on jack rabbit (*Lepus californicus merriami*), March 28, 1909. All of these collections were made by Mr. J. D. Mitchell near Victoria, Texas, except the lot on jack rabbit which was collected in Refugio Co., Texas. Five other lots of nymphs of this species were collected by Mr. Mitchell. Some specimens in each of these lots were bred to adults as well as a careful determination being made of the nymphs. The records on these collections are as follows: 9 nymphs on meadowlark, February 20, 1909; 6 nymphs on meadowlark, March 23, 1910; 1 nymph on quail, March 24, 1910; 4 nymphs on meadowlark, March 25, 1910. The last lot was collected in Calhoun Co., Texas, all of the others were taken in Victoria Co., Texas.

The specimens obtained were in all states of engorgement. The fact that all of the collections were made during the winter and early spring does not preclude the likelihood of the occurrence of the immature stages on hosts during the summer months as well, as few hosts were examined in other than the winter season in the region where this species is common.

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PROFESSOR ROBERT COLLETT ON *PTERYCOMBUS BRAMA* FRIES.

BY R. W. SHUFELDT.

Nearly twenty-five years ago the present writer published in the *Journal of Morphology* a paper entitled "Further Studies of Grammicolepis brachiusculus Poey" (Vol. II, No. 2, Nov., 1888, pp. 271-296, figs. 1-14). This paper consisted in a translation and republication of Professor Poey's description of that very remarkable, and, so far as known at this writing, unique form of fish.[*] My contribution considerably augmented the valuable paper just cited, especially in the matter of osteological comparisons made with the skulls and parts of the vertebral columns of other species of fishes. These were recommended by Doctor Theodore Gill, who kindly furnished me from his own collection material for the purpose. The Smithsonian Institution also loaned Dr. Gill additional specimens for the purpose, which were forwarded to me at Fort Wingate, New Mexico, where I was serving as Post Surgeon at the time, and where I studied and wrote out my account of *Grammicolepis*.

As Professor Poey believed that the species was more nearly related to the *Carangidæ* than any other family of fishes known to him, most of my material for comparison belonged to that group, as, for example, skulls and other bones of *Caranx hippos*, *Teuthis cœruleus*, *Pomacanthus paru*, and a few others. The skulls of some of these I figured and published in my article, particularly the three species just given. There was one fish, however, that I especially desired to compare with *Grammi-*

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[*] *Anal. de la Soc. Esp. de Hist. Nat.*, Tom. II, 1873, by Felipe Poey.

colepis and that was the common "Pomfret" from the coast of South America and elsewhere. This fish belongs to the family *Bramidæ* and is known to science as *Brama raii*, and I regret to say that up to the present writing no example of it has ever been in my possession for anatomical or other examination. Poey had already pointed out the presence of the long vertical linear scales in *Grammicolepis*; these also occur in *Brama*, though they are much shorter and principally evident in the mid-lateral area. However, apart from the decidedly forked tail and small eye of *Brama*, there are at least some points in the external appearance of the latter to remind us of *Grammicolepis*.[*]

In going over my collection of author's ichthyological reprints lately, I met with a copy of Professor Robert Collett's valuable contribution on *Pterycombus brama*, which was published in the Norwegian language some twelve years ago.[†] This paper with its two plates throws not a little light on the morphology of both *Grammicolepis* and *Brama*, and upon this account, if no other, it is quite worthy of a translation into English. Dr. Collett writes me that it has never been so rendered, as far as he is aware. By the aid of my camera I have copied, and herewith reproduce, the two plates illustrating it.

My translation of the original contribution is as follows:

> Through the courtesy of curator Storm, of the Museum in Trondhjem, I had the opportunity in the summer of 1895 to examine a recently captured, and very well preserved, specimen of *Pterycombus brama*, taken upon the coast of Nordland during the spring of the same year. As the Museum of the University of Christiania had already in its collection three examples of the same species,[‡] and as I at the same time, through

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[*] This may be appreciated by comparing my figure of *Grammicolepis* and the one of "*Brama raii*," plate 112 of Goode's *The Fisheries and Fishery Industries of the United States*, 1884. It will be noted, that in the case of *Brama* the low dorsal fin is continuous and the pectoral fin long and acute, which is not like what we find in the form described by Poey.

[†] COLLETT, R. *Om Pterycombus brama* Fries, Bergens Museums Aarbog, 1896. No. VI, with two plates. One of these latter presents a right lateral figure of the species, and the other a left lateral figure of its entire skeleton.

In conversation with Dr. Tarleton H. Bean I am told that a translation of this paper would be of great value to such students of ichthyology as were unable to read the work in the original. This translation has been kindly made for me by Miss M. U. Overland, of New York City, a translation that, so far as my labors were concerned, merely required a transcription into the language of science. Doctor Bean further informs me that there are no specimens of *Pterycombus brama* in the United States, so far as he is aware.

[‡] One in alcohol, one dried, and one skeleton.

the courtesy of Dr. Brunchorst, have received for examination the two specimens at present contained in the Bergen Museum, I will here offer a few remarks on this remarkable species.

Several descriptions of *Pterycombus brama* have appeared and consequently the external appearance of this form, in so far as its principal characters are concerned, is known, notwithstanding the fact that none of the descriptions has been made from either fresh or uninjured specimens.

Originally the species was described by Professor B. Fries in 1837, from a dried specimen obtained by the State Museum in Stockholm, and the general characters in this description, given by that excellent ichthyologist, accompanied as it is by a photograph of the dried specimen, are quite fully presented (1). Professor Fries placed this new form in the family *Scombridæ*, and considered it as being most nearly related to *Pteraclis* Gronov., a genus which later on, and for better reasons, has been relegated to the family *Coryphænidæ*.

In 1855, Professor Nilsson, in his *Scandinavian Fauna*, gave a new description of the same specimen, which he had examined during the previous year in the State Museum (2). Nilsson here, for the first time, pointed out its close relationship to *Brama* Schneider, and he referred both to the *Squamipinnes*, a group represented by species having a number of external characters in common with them, including the partly scale-covered fins.

The next author treating of this genus is Professor Lilljeborg, who, in 1865, in his letter of invitation to the Upsala Re-union on November 4, 1864 (published simultaneously in the Year Book of the Upsala University for 1865), made some observations based upon six other specimens obtained in Norway during recent years, which the author had the opportunity of examining in 1861 in the Museums of Bergen and Christiania (3). A supplemental description is given of one of the specimens in the collection of the Bergen Museum (taken near Bergen); Lilljeborg here correctly points out that the relationship of *Pterycombus* (and *Brama*) to the *Squamipinnes* is only an apparent and not a real one. He is inclined to consider that these species more likely constitute an aberrant group falling within the family *Scombridæ*, with only certain affinities with the *Squamipinnes*.

In a paper read at the Congress of Naturalists in Christiania in 1868, on the Fishes of Finmarken, Professor Esmark was the next one to announce the discovery of another specimen, which had been sent to the Museum of the University from the fjord of Varanger in 1866 (4).

When I published my *Fishes of Norway* in 1874, ten specimens were recorded of this species as having been taken on the coasts of Norway (5). Later on, or in 1879, in the first supplement to this work (6), the added information was given of an eleventh specimen, it having been taken at Hammerfest in 1877, and in 1884, in the second supplement (8), reported the taking of the twelfth specimen which was obtained at Egersund in 1880. However, as one of the earliest accounts has proved to be unreliable, it is safe to say that only eleven specimens is the correct number known.

A very interesting observation was made in 1880 in regard to this remarkable form by Professor Lütken. It occurs in that volume of "Spolia Atlantica" in which he describes the various stages of development in the young of the pelagic Acanthopterygians (and of *Scombresox*), and he there presents (7) illustrations and descriptions of a very young fish taken from the intestine of an "Albacore" (*Thunnus alalonga*) in Lat. 8° N. Long. 24° W., that is to say, a little to the southward of the Cape Verde Islands. The length of this specimen was twenty-two millimeters.

This young fish, although found in the tropical zone of the Atlantic Ocean, is nevertheless considered by this author as belonging to *Pterycombus*, and possibly a specimen of *Pterycombus brama*, a species hitherto considered as occurring only in the subarctic seas. Should this conjecture be confirmed through the discovery later of adult specimens, it would go to prove that the species is not confined to the seas of the North, but is rather to be considered as having a wider range, extending even to the deep seas of the middle and north Atlantic; and that occasionally it may have been carried out of its habitat through the agency of the warmer ocean currents, and thus have strayed to the northern coasts.

In the paper just cited, Professor Lütken places *Pterycombus* in the family *Bramidæ*. Gill, in 1872, in his "Arrangement of the Families of Fishes" (Smiths. Miscell. Collect. No. 247, Washington, Nov., 1872) had already divided the *Coryphænidernes* into several families of which the *Bramidæ* and the *Pteraclididæ*, which contain respectively *Brama* and *Pteraclis*, were two; in 1892, Jordan and Gilbert, in their "Synopsis of the Fishes of North America" (Bull. U. S. Nat. Mus., No. 16, Washington, May, 1882) places both of these genera in the family *Bramidæ*, and which, according to Professor Lütken, includes the genus *Pterycombus*.

In his "Scandinavian Fauna: Fishes" (9), Professor Lilljeborg in 1891 next gives us a new and revised description of this form, in which its specific characters are most clearly determined. Here the species is still retained in the family *Coryphænidæ*.

In 1892 Professor Smitt, in the revised edition of Wright, Ekström and Sundevall's "Scandinavian Fishes" (10) invites attention to the close similarity in the matter of the Morphology of the scales in *Pterycombus* (and *Brama*) as compared with the Pycnodonts from the Liassic,[*] the latter being a group distinguished by its peculiar pleurolepine scales arranged in rib-like rows, the nature and structure of which has not, as yet, been fully determined.

In his account of this species, Smitt, who at the time had before him only two dried and imperfect specimens, gives us an exhaustive description of the scales and the fins.[†] In addition to the illustration showing the scales on the body, Fries's original figure of the dried Type-specimen is here reproduced.

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[*] WOODWARD, Cat. Foss. Fishes, Brit. Mus. Pt. III, p. 189, Lond., 1895.

[†] In his differential diagnosis of the two genera *Pterycombus* and *Brama*, he mentions (as did Lilljeborg in his above cited paper of 1891) the fact, and refers to it as an important character, that the skin on the unpaired fins is scaleless in *Pterycombus*, but is scaled in *Brama*. This is not invariably the case in well-preserved specimens of *Pterycombus* where we meet with a row of minute scales on the skin between the spines of the anterior portion of the fins, and in the case of the caudal fin, along the upper and lower rays.

Finally, this genus is dealt with by Struxberg in his recently published "Fish Fauna" (11), and his description is accompanied by a reduced reproduction of Fries's figure already referred to above.

Since 1834, then, when the first specimen of this genus was secured by the Government Museum in Stockholm from Finmarken, and was there described by Fries in 1837, 13 specimens at least have been taken on the coasts of Norway and have been preserved.[*] Of these one specimen, according to the account given by Professor Lovèn, has already been sent to France;[†] together with the type-specimen, one has been sent to the Museum at Stuttgart; the remaining specimens are all preserved (with the exception of one which has been lost trace of) in the various Museums of Norway, in Stockholm and in Upsala.

With the exception of three, all of these 13 specimens were taken in the arctic seas, or along a stretch of coast-line extending from Tromsö and Altenfjord up to Varangerfjord. Of the remaining ones, one came from Nordland, one from the reefs off Bergen, and one from Egersund.

These widely separated points of capture, extending from the southernmost point of Norway to the Russian boundary, would appear to confirm the above made suggestion, that *Pterycombus brama* is a pelagic rather than a true arctic species.[‡]

FINMARKEN.

Hammerfest (prior to 1834) (dried)	Government Museum Stockholm.
Altenfjord (prior to 1837)	One to France.
Finmarken (prior to 1861)	Bergen Museum
Finmarken (prior to 1861)	sent to Bergen Museum. (Skeleton) Univer. of Christiania.
Finmarken (prior to 1861)	sent to Bergen Museum. (Dried) Upsala Museum.
Finmarken (prior to 1861)	sent to Bergen Museum. (Dried) ?
Varangerfjord (prior to 1861) (Dried)	Univ. Museum Christiania.
Varangerfjord, October 29, 1866	Univ. Museum Christiania.
Hammerfest, November 28, 1877	Tromsö Museum.

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[*] It is evident that this fish has been found much oftener and not preserved. Frequently specimens have come into the hands of fishermen, who were unfamiliar with it, but whose descriptions point to the fact of there having been examples of either *Pterycombus* or else *Brama*, and these specimens have been thrown away by their captors as valueless. As an example of this, we know of such a specimen having been taken at Andenses in Vesteraalen in 1876, and still another at Alstens in Helgeland (Nordland) in December, 1877.

[†] FRIES, Kgl. Vet. Acad. Handl., 1837, p. 15.

[‡] In 1868 Professor Esmark (Forh. Skand. Naturf. Möde i Chra. 1868) (Proc. of the Cong. of Scandinavian Naturalists at Christiania, 1868, p. 522) states that: "to my knowledge, seven specimens in all have been received by the University." What he probably meant to convey here is—instead of the University—all the Museums of the country, for I meet with no proof that the collection of the University ever contained more than the three specimens named above.

COAST OF TROMSÖ.

Nord-Reisen, October, 1895 . . . . Mus. Stuttgart.

COAST OF NORDLAND.

Alderen, April, 1895 . . . . Trondhjem Museum.

COAST OF BERGEN.

Bergen (prior to 1861) . . . . Bergen Museum.

SOUTHERN COAST OF NORWAY.

Egersund, 1880 . . . . Stavanger Museum.

The eight (nine?) specimens which are now contained in the various museums of Norway measure as follows:

(Measurements in millimeters.)

		Total length.	Length to the last caudal vertebra.	Height of body (without fins).	Length of head.	
Varangerfjord	1866.	370	295	121	75	Univ. Mus. Chris. a.
Varangerfjord	1861.	370	298	120	75	" " "
Nordland	1895.	375	290	143	83	Trondhjem Museum.
Hammerfest	1877.	380	293	117	77	Tromsö Museum.
Finmarken	1861.	395	320	130	80	Bergen Museum.
Egersund	1880.	410	315	150	88	Stavanger Museum.
Bergen	1861.	411	318	137	85	Bergen Museum.
Nord-Reisen	1895.	455	349	175	90	Museum at Stuttgart.
Finmarken	1861.	465	339	160	100	Univ. Mus. Chris. a.

It will be observed that the total length of the specimens varies from 370 millimeters to 465 millimeters,* and all of the specimens were apparently adult. The two specimens in the Swedish Museums are of the same size as those just given.

The majority of the specimens of which we have any data were found floating on the surface of the water, and either dead or in a dying condition; others are beach specimens, having drifted ashore. One example, it is said, was taken by hook and line at a depth of a couple of hundred fathoms, some three miles west of Bergen, and still another (Varangerfjord 1866) was captured in a salmon net, set in rather shallow water, and only a few feet below the surface. This specimen was probably about to drift ashore. This last-named example was a male with enormous testes; the intestine contained, besides slime, a number of hard and transparent spiculæ of unknown composition, as well as numerous small *Scolices*.†

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* In the "Fishes of Norway," 1874, the total length of the specimen taken in Verangerfjord in 1866, is, through a typographical error, given as 350 instead of 370 mm.

† Dr. Einar Lönnberg has been kind enough to examine these last. He is of the opinion that they are specimens of "*Scolex polymorphus*" under which name he assumes that the larvæ of the genera of *Acanthobothrium* are included.

Since 1880 but two specimens of this species have been found on the coasts of Norway, both in 1895.

One of these was found floating on the surface of the water about the middle of April, 1895, at Alderen (coast of Helgeland, Nordland), and was sent to the museum in Trondhjem. The other was found in Nord-Reisen in October, 1895, and was sent to the Tromsö Museum, which in turn donated it to the Royal Natural History Collection in Stuttgart, where it is now to be found.

The first-named of these specimens I had an opportunity to examine in the Trondhjem Museum in July of the same year, was in excellent condition, and so well preserved that the natural colors still persisted nearly throughout. It was apparently adult, and of an average size. Its measurements were as follows: Total length, 375 mm. Length to the tip of the middle caudal ray, 323 mm.; to the distal end of the spinal column, 290 mm. Height of the body (to the terminal line of the scales), 158 mm.; to the base of the rays, 143 mm. Length of head, 83 mm. Diameter of an orbit, 32 mm. Diameter of postorbital depth of head, 35 mm. Length of premaxilla, 42 mm.; mandible, 29 mm. Longest of the dorsal rays (the 21st), 135 mm.; longest of the anal rays (the 6th), 130 mm. Length of the pectoral fin, 86 mm.; the ventral, 24 mm.

COLOR: Portion above the lateral line is a brilliant steel-blue, showing in iridescence green and purple tints; below the lateral line the body is of a silver color. The rays of the dorsal and anal fins are whitish until they approach the apices; the entire membrane is black.

The pectorals are uniformly yellowish white, semi-transparent, while the superior margin of this fin is black (the 2d ray). At the base of the fin next to the body the pectoral is of a blue-black. The ventral fins are entirely black with the mesial apex whitish and transparent. Sclerotic above, bluish black. Iris light (whitish yellow?).

The number of the rays was as follows: Dorsal, 9 | 44; Anal, 3 | 39; Ventral, 1 | 5; Pectoral, 2 | 18.

The lateral line possesses 48 scales (of these 21 to the apex of the pectoral); of the spiny-pointed scales there were found on this specimen only 11 rows; the 5–6 rows nearest the ventral line, and 3–4 nearest the dorsal line being almost smooth.

Of the second specimen (the one from Nord-Reisen above Tromsö) which was sent to the Stuttgart Museum, I have, through the courtesy of Professor Lampert, obtained some measurements of, which are given in the table above.

As stated above, the Museum of the University of Christiania possesses a skeleton prepared from a specimen received from Finmarken (in the 50's). The total length of this skeleton is 445 mm. (The specimen when fresh measured 465 mm.)

In its skeletal characters *Pterycombus* comes nearest *Brama*, but it departs from that species in a number of osteological details or characters, especially in the morpholgy of the spinal column. The massive development of the ribs is particularly striking, the neural spines and the dorsal interspinals form together an almost solid perpendicular wall of bone, which is entirely different from anything known as pertaining to the other genera of the Scombroids. In this respect it so far departs from what we find in its apparently nearest relative *Brama*, that it should probably be placed in a family by itself.

The *cranium* departs but slightly from what we find in *Brama*,* is proportionately higher and shorter than in *Brama*, the height here being greater than the length. The lofty fronto-occipital crest so characteristic of *Brama*, *Lampris*, *Coryphæna* and the majority of the *Scombroidea*, and which in the first-named attains a height which about equals the diameter of the orbit, is in *Pterycombus* low and short. It arises here posterior to the anterior margin of the orbit in the frontal region (consequently completely posterior to the ethmoid) about midway between the first interspinal and the premaxilla. The greatest height of the crest, which is about opposite the middle of the orbit, is only one-fourth the diameter of the latter. This crest is formed almost entirely by the frontals, the supraoccipital making up but a very small portion of it; that part between the first interspinal and the posterior margin of the supraoccipital is triangular in outline, membraneous in structure and is found above the occipital bone. The level area, which is seen on the superior aspect of the cranium, which the supraoccipital and frontals together form, and from which the crest arises, is in *Pterycombus* relatively short, its entire length being about equal to the orbital diameter. It exhibits but a few rugose lines which radiate from a point directly beneath the center of the supraoccipital crest, or the frontal crest, and pass directly outward to the margins. In *Brama* this surface is considerably longer, almost twice as long as the orbital diameter, and exhibits a couple of raised longitudinal lines which pass in an anterior direction.†

POST-TEMPORAL, Parker, (Supra-Scapula, Owen), is bifurcated as in *Brama*; either fork is broad and flat, without any elevations or lateral processes at the base of the superior limb.

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*In the specimen of *Pterycombus* before me, the entire hyoidean apparatus is missing.

†The more I study Professor Collett's skull of *Pterycombus* (herewith reproduced) and his description of that part of the skeleton in *Brama*, and compare both with my figures and descriptions of the corresponding structure; in *Grammicolepis*, the more I am inclined to believe that *Pterycombus* and *Grammicolepis* are related genera, with *Brama* not very far removed. Further, there seems ground to believe, that in the case of all three of these genera of fishes, each is a representative of a separate family. Two of them have already been established, as the *Bramidæ* and the *Grammicolepidæ* (Poey), and, unless some other naturalist has already done so, it would seem that *Pterycombus brama* represents a group having similar rank,—that is, the family *Pterycombidæ*. Professor Poey was of the opinion that the *Grammicolepidæ* came nearer to the *Carangidæ* than any other family known to him at the time he established the former, and I was disposed to concur in his opinion; but since reading Collett's paper, I am inclined to think otherwise, and adopt what would appear to be a most natural arrangement, or the one above suggested. All three would appear to be related by a variety of characters more or less closely with the *Berycidæ*; the *Balistidæ*; *Acanthuridæ*, and the *Scombridæ*, especially the last-named.

The skeletal and other characters given above by Professor Collett found in *Pterycombus brama* are ample, in my opinion, to justify the establishment of the family *Pterycombidæ*. R. W. S.

SUPRACLAVICLE, Parker, (Scapula, Owen), is rather long and narrow; the width (9 mm.) being equal to one-fourth the length (36 mm.).

POSTCLAVICLE, Parker, (Epicoracoid, Owen), is normal, with long styliform process.

CORACOID, Parker, (Radius, Owen), which in *Brama* is large and of broad oval outline, suggesting the immense coracoid in *Lampris*, is here in *Pterycombus* much narrower and directed more anteriorly. Its length in the specimen now being examined is 53 mm., the greatest width 20 mm. Along its mesial margin it is formed partly in membrane, and exhibits a little below its center an oval notch, which is quite circular in *Brama*. Just within its outer margin two elevated longitudinal rays radiate from the actinosts; the superior one, which is the smaller, is quite short, while the lower one, which passes somewhat internal to the margin of the bone, is continued almost to its anterior end. The PELVIC GIRDLE is small, slender but otherwise normal.

RIBS. These number 23, of which twenty of the posterior pairs exhibit an unusual development. They are broad, hollow, and together form a bony wall without interstices, as each rib is so broad that its posterior margin overlaps the edge of the rib next behind it. They are relatively short, being attached to the downwardly produced apophyses in such a manner that their truncated superior parts reach to the center of the vertebræ.

FIRST RIB is articulated with the third vertebra, and is short, being only slightly broader at its head than it is at its free extremity (therefore about normal). *Second* and *third ribs* are somewhat broader at their articular ends, but are rapidly reduced in size as the free ends are approached, finally terminating in an elongated delicate ventral extremity.

The *fourth* to the *twenty-third ribs* are very characteristic. A typical one, the eighteenth, is here shown in the cut, and may be described as follows: The vertebral extremity, which is intimately articulated at the external aspect of the parapophysis, is almost square or cubical in form, and is hollowed out up as far as its head. This excavation is continued as a groove for a little distance down along the internal border of the rib, and thereafter terminates in a long, extremely attenuated free ending. At its broadest part the superior excavation is nine millimeters broad, measured in the antero-posterior direction, while its thickness internally is rather less than 5 mm.; its height (13) somewhat exceeds its width, and constitutes not quite one-third of the entire length of the rib (44 mm.).

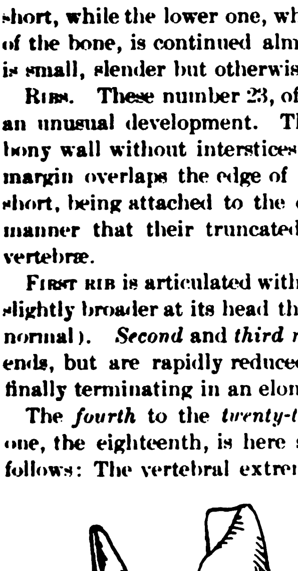

Fig. 1.
Ribs of *Pterycombus brama*.
(Nat. size.)

In the *five posterior pairs of ribs* the postero-superior angle of the excavation is produced as an apophysis, flexed caudalwards, and which is, particularly on the ultimate rib, long and slender, projecting outward over the 25th vertebra. The last two pairs of ribs articulate with the parapophyses of the 24th vertebra.

There are *fifty vertebræ* in the spinal column, of which 24 are thoracic and 26 caudal. The body of the *first vertebra* is rudimentary, while its neural spine is well developed. The ribs articulate with the third to the twenty-fourth vertebræ inclusive.

The neurapophyses (neural spines) are remarkably robust and broad, especially in the thoracic region, where at their bases they have a longitudinal diameter almost equal to the length of the body of the vertebra to which any particular spine is attached. (See Plates.)

For this reason, these neurapophyses almost come in contact with each other, anteriorly and posteriorly, at their bases. As we pass backward, these neural spines of the thoracic vertebræ become more slender, although in this part of the spinal column the distance between them, at their bases, is less than their own longitudinal diameter, in the case of any two contiguous spines. In the caudal region they become more and more slender as we approach the tail, though still stouter than we find them in *Brama*.

The first and second neural spines are vertical, or inclined slightly forward, the remaining ones are as we usually find them.

The most lofty ones are met with on the ultimate thoracic vertebræ (37 mm.).

The *parapophyses* of all the rib-bearing vertebræ are directed downward, and each has a length somewhat exceeding the depth of the body of the vertebra to which any particular one belongs. The parial parapophyses of any vertebra in the abdominal region fail to come in contact mesially, and therefore do not form true hæmal arches.

On the caudal vertebræ the hæmal spines are at once greatly produced; the one on the leading caudal vertebra possessing a length of 45 mm. Their antero-posterior diameters at their bases equal those of the corresponding neural spines in any particular vertebra, and as we proceed backward the amount of reduction in point of size is also nearly proportionately coequal.

Secondary ribs ("Scleral-Spinæ": supplemental or auxillary ribs) are to be found on all the anterior vertebræ of the spinal column until we reach the second or third ultimate abdominal ones, where there is not the slightest trace of them in the specimen at hand.

On the first and second vertebræ they are attached to the hæmal arch; on the third to the seventh they articulate with the centrum of the vertebra ("Corpus:" "*Epicentralia*"); on the remaining vertebræ with the anterior surface of the superior border of the rib ("*Epipleuralia*"). These *auxillary ribs* attain their greatest length (20 mm.) in the mid-series of the thoracic region, where they about equal the length of four of the centra of the vertebræ.

The *interneural spines* (the dorsal interspinal bones), are immense, very broad, and so close together that they are in contact with each other along their entire lengths, thus forming an almost continuous plate of bone in the anterior region of the spinal column.

The eight leading ones which support rudimentary rays are all anterior to the first neural spine, and are in immediate contact with the supraoccipital bone, forming with it, superiorly, a solid crest, the base-line of which (23 mm.) is one-third less than the height.

Those next succeeding possess the same breadth and length as the leading ones, and are quite as close together; but as we proceed backward, the distance between them becomes slightly increased, and it is only after we arrive at the posterior abdominal ones that they become decidedly narrower and of a size less than the distance between any two of them. In the caudal region they become progressively and rapidly reduced in both the matter of length and size, until we reach the tenth and twelfth caudals, where they are almost rudimentary in character. They exhibit their greatest length (43 mm.) over the anterior thoracic vertebræ, where they are almost twice as long as the neural spines opposite them, with the apices of which they come in contact.

Interhæmal spines ("the ventral interspinal bones") are all slender and rather short; they possess their greatest length beneath the anterior caudal vertebræ, but even here they are, for the series, shorter than the corresponding hæmal spines.

The *dorsal rays*, 53 in number, in the specimen before me, start at once over the leading interspinals; the first eight, whose corresponding interspinals surmount the superior aspect of the skull and precede the first neural spine, are short.

There are 41 *anal rays*.

The *Pseudobranchiæ*, with a length of 16 mm. are well developed.

The *Gills*: The leading arch is supplied with a mesial row of "teeth," eight in number, and about 6 mm. in length; they extend from a point almost directly beneath the orbits, and are continued forward as mere tubercles to the apex of the arch.

The lower or *inferior pharangeals* likewise support (5) minute tubercles. Upon the remaining *branchial arches* we find no true "teeth," but only rudimentary tubercles in place of them.

The Literature of Pterycombus Brama.

(Translated.)

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5. Collett, R. The Fishes of Norway, with remarks upon their distribution. (Supplement to the Proceedings of the Scientific Society of 1874, No. 35, pp. 47–48.) Christiania, 1875.
6. Collett, R. Observations on the Fishes of Norway during the years 1874–1875. (Proceedings of Scientific Society of Christiania, 1879, No. 1, pp. 30, 31. Read at the Meeting on February 21, 1879.) Christiania, 1880.
7. Lütken, Dr. Chr. Spolia Atlantica, Contribution to the Study of development in Fishes, etc. (Publications of the Scientific Society, Pt. 5. Natural Science and Mathematics. Part B. XII. p. 501, 502.) Copenhagen, 1880.
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9. Lilljeborg, W. The Fauna of Sweden and Norway. Fishes. Part I. (pp. 290–298). Upsala, 1891.
10. Smitt, F. A. Scandinavian Fishes painted by Von Wright, described by Fries, Ekström, and Sundevall. 2nd Edition, First Part. pp. 71–75. Stockholm, 1892.
11. Struxberg, Anton. Fishes of Sweden and Norway. p. 96. pp. 198–200. Gottenborg, 1895.

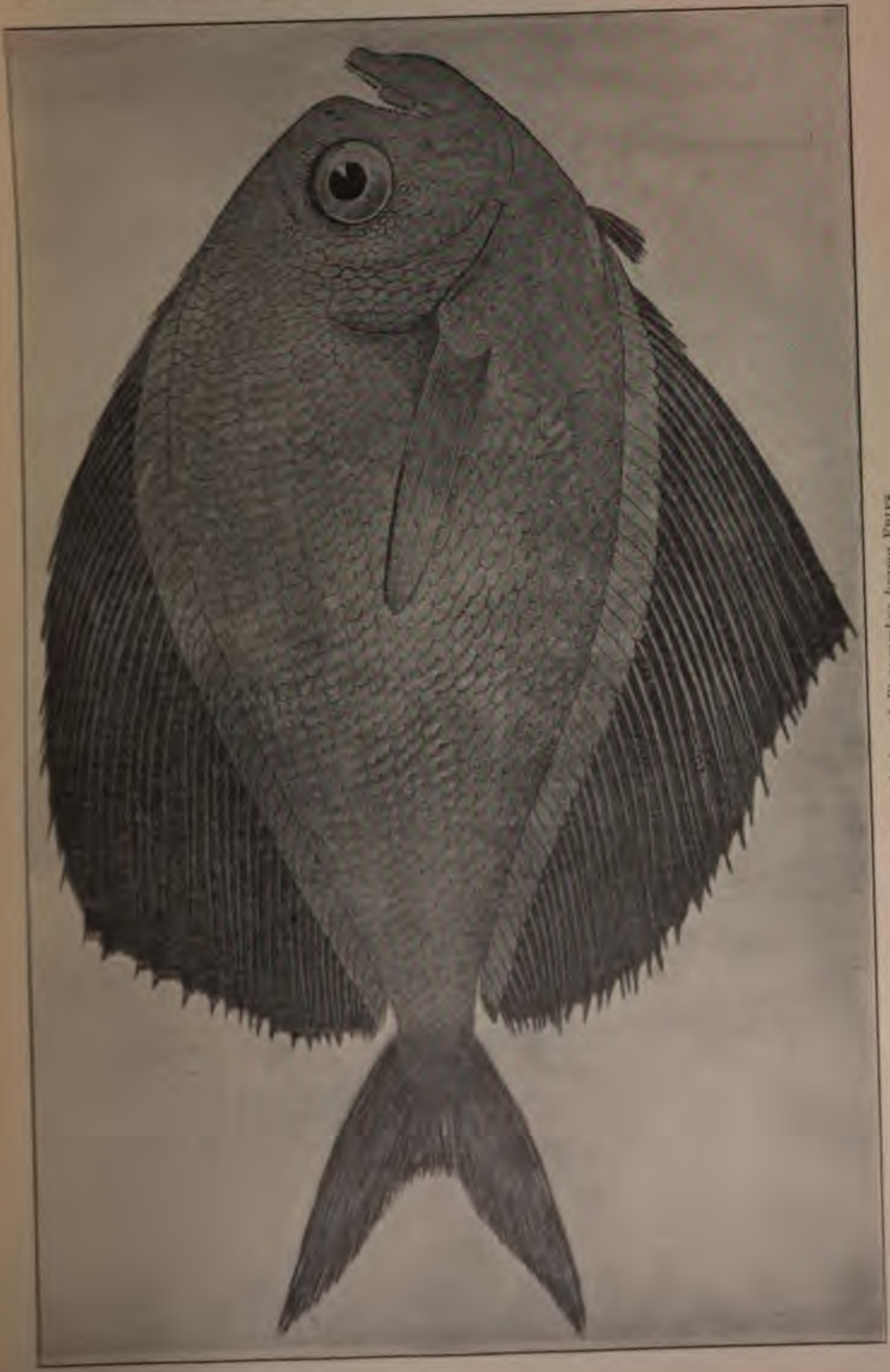
Explanation of Plates.

Plate I.

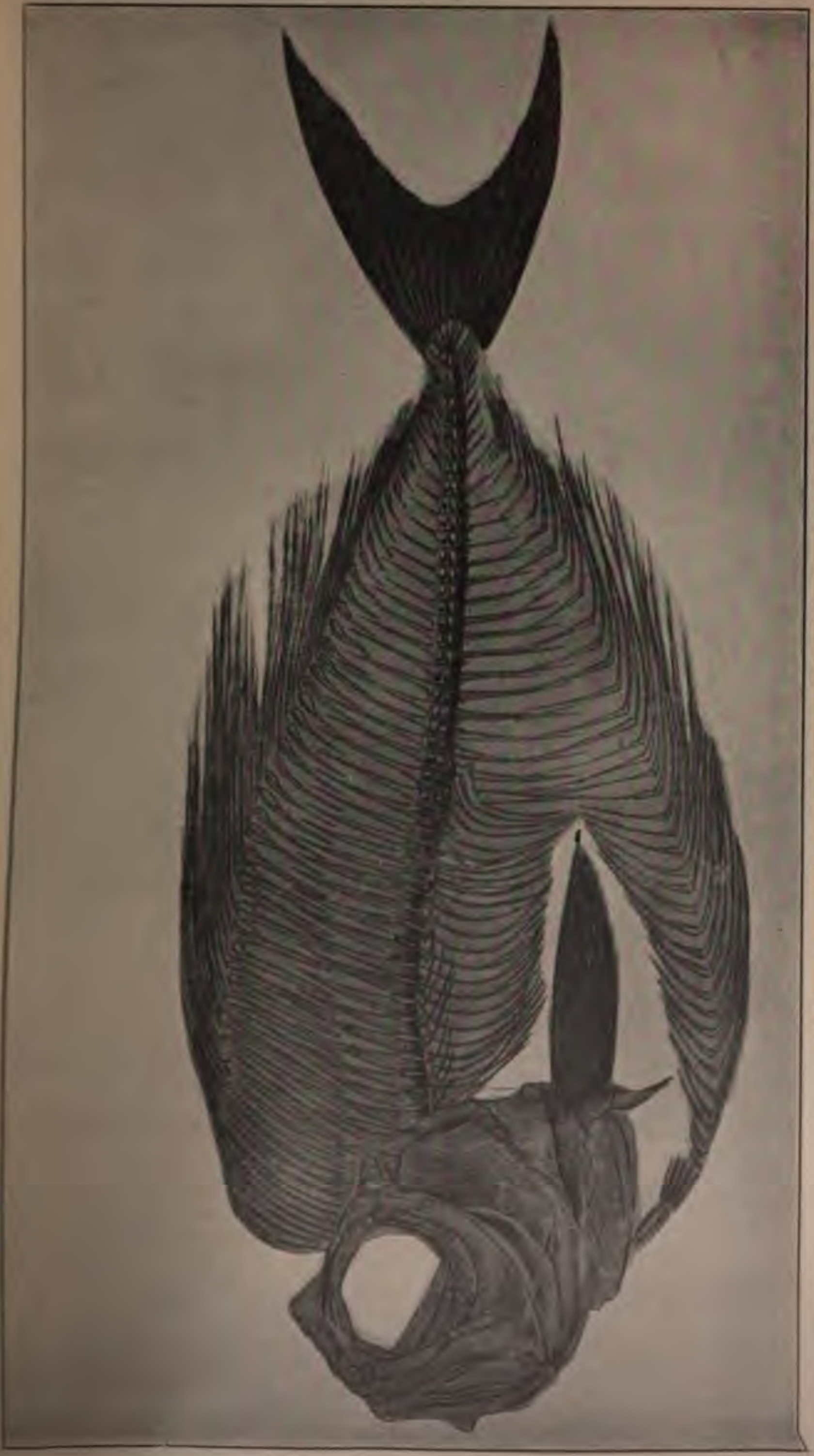
Right lateral view of *Pterycombus brama*, Fries.

Plate II.

Left lateral view of the articulated skeleton of *Pterycombus brama* Fries. Both plates by Shufeldt after Collett.



Right lateral view of *Pterycombus brama* FRIES.



Left lateral view of the articulated skeleton of *Pterycombus brama* FRIES.

Vol. XXV, pp. 51-52 March 19, 1912

PROCEEDINGS

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A NEW CAREX FROM ALBERTA.

BY KENNETH K. MACKENZIE.

[During the summer of 1911 Mr. N. Hollister and Mr. J. H. Riley, while engaged in field work in western Alberta and eastern British Columbia, gathered, in addition to their collections of animals, a series of about two hundred characteristic examples of the plant life of the region. Three of the higher plants represented undescribed species, and diagnoses of them have recently been published.* The representatives of the difficult genus Carex were forwarded to Mr. Kenneth K. Mackenzie of New York City, who has been engaged in the preparation of a monograph of the North American species. While only three species are represented in the collection they are of unusual interest, since one appears to be undescribed and another has rarely been collected. A diagnosis of the new species, prepared by Mr. Mackenzie, is published here at his suggestion.—*Paul C. Standley.*]

Carex atrosquama Mackenzie, sp. nov.

Culms in dense clumps, 30 to 45 cm. high, phyllopodic, slender, erect or the apex nodding at maturity, sharply triangular, slightly roughened toward the apex, much exceeding the leaves, purplish-brown tinged and slightly fibrillose at base; leaves with well-developed blades seven to ten to a fertile culm, inserted on the lower fourth, mostly clustered near the base, the blades deep green, flat with slightly revolute margins, 2.5 to 3.5 mm. wide, 10 to 20 cm. long, roughened toward the apex; opaque part of sheaths whitish or yellowish-white; spikes three or four, approximate or the lower slightly separated, the lower one or two on erect peduncles half to twice their length, the others sessile or nearly so, oblong, 6 to 12 mm. long, 5 mm. wide, densely 15 to 30-flowered, the appressed perigynia in several ranks, the lateral spikes pistillate, the terminal gynaecandrous and clavate at base; lowest bract leaflet-like, slightly sheathing, not purplish tinged, shorter than or exceeding the inflorescence, the others much reduced; scales broadly ovate, obtuse or slightly acute, black, the midvein obsolete, the upper margins not at all or but very slightly hyaline, about the width of but markedly shorter than the perigynia; perigynia olive-green, slightly purplish-spotted, membranaceous, slightly inflated and subtriangular, nerveless, puncticulate, narrowly obovoid, 3.25 mm. long, 1.75 mm. wide, glabrous, round-tapering at base, minutely roughened on margins above, abruptly contracted into a minute, shallowly bidentate, purplish-black beak, scarcely 0.5 mm. long; achenes triangular, obovoid, 1.5 mm. long, 0.75 mm. wide, scarcely stipitate, half the length of the perigynia; style little exserted, its base slender; stigmas three, very short.

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* Smiths. Misc. Coll. 56: No. 23.

The type, collected at the head of Smoky River, Alberta, August 5, 1911, by N. Hollister (No. 14), is in the U. S. National Herbarium, No. 622,651. J. H. Riley's No. 61, from South Fork of Moose River, British Columbia, July, 1911, is also to be referred here (U. S. National Herbarium, No. 622,594).

Carex atrata L. and several of its close allies, to which the present species is related, are all distinguished by the strongly compressed perigynia, and in all of them the achene is much narrower than the perigynium, the empty part of the latter appearing almost wing-like. The slightly inflated subtriangular perigynium of the present species, which is but little wider than the achene, is in strong contrast to the perigynium of any of these species.

Vol. XXV, pp. 53-56 April 13, 1912

PROCEEDINGS

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Stanford Univ. Library 1912

THE STATUS OF BUTORIDES BRUNESCENS (LEMBEYE).

BY HARRY C. OBERHOLSER.

A recent investigation into the races of *Butorides virescens*, undertaken for the Biological Survey of the United States Department of Agriculture, involved an examination of the peculiar *Butorides brunescens* of Cuba. This was necessary in order to determine the proper name for the form of *Butorides virescens* inhabiting the island of Cuba, since, if *Butorides brunescens* should prove to be merely a color phase of *Butorides virescens* in Cuba, the subspecific name of that form would, of course, become *brunescens*. Although the number of specimens examined is small, for *Butorides brunescens* is a rare bird in collections, the conclusions reached seem worthy of permanent record. To the authorities of the United States National Museum acknowledgments are due for the use of the specimens which form the basis of these notes.

Described from an unknown locality in Cuba, by Lembeye, in 1850,* *Butorides brunescens* has often been considered a color phase of *Butorides virescens*, though by some authors treated as a distinct species.† In addition to the fact that it occurs only in Cuba and the Isle of Pines,‡ where it seems to be permanently resident, all the evidence gathered from the examination of between 500 and 600 specimens of the various forms of *Butorides virescens* and several examples of *Butorides brunescens*, both adult and young, points to the conclusion that the latter is a perfectly distinct species, though of about the same size as *Butorides virescens* from Cuba. It has also the same habits and associates freely with the latter, at least on its feeding grounds.

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* *Ardea brunescens* Lembeye, Aves de la Isla de Cuba, 1850, p. 84, pl. XII.

† Baird, Rep. Explor. and Surv. R. R. Pac., IX, 1858, p. 677; Ridgway, Manual North Amer. Birds, 1887, p. 131; Cory, Auk, IV, 1887, p. 327; *et al.*

‡ The ostensible Jamaica record (March, Proc. Acad. Nat. Sci. Phila., 1864, p. 61) is based on a mere supposition of its occurrence there.

In adult plumage the uniform chestnut neck and sides of head, the dark, inconspicuous wing edgings, and other less striking characters, distinguish it at a glance from any of the forms of *Butorides virescens*, save perhaps occasional specimens from the island of San Miguel, one of the Pearl Islands, in the Bay of Panama, to which superficial resemblance Messrs. Thayer and Bangs have already called attention.* With this bird, however, there is not any real intergradation in color, for *Butorides brunescens* never has, so far as we know, the broadly whitish edge of wing, the narrow pale margins of wing-coverts, nor any indication of a median light or white stripe on throat or jugulum, all of which are present in even the most extreme specimens of *Butorides virescens* from the Pearl Islands. In juvenal plumage there is still more striking contrast of colors, for the juvenal stage of the bird from the Pearl Islands is of practically the same pattern as the young of all the other races of *Butorides virescens*, and thus very different from the dark, dull, almost uniform (except for pileum, wings, back, and tail) brownish coloration of juvenal *Butorides brunescens*. Nor is there, in the young, any suggestion of intermediate vergence toward any form of *Butorides virescens*. The following further account of this rare species may prove of interest in this connection.

Butorides brunescens (Lembeye).

Ardea brunescens Lembeye (Gundlach MS.), Aves de la Isla de Cuba, 1850, p. 84, pl. XII (Cuba).

Ardea brunnescens A. and E. Newton, Ibis, 1859, p. 262 (Cuba; in text); Gundlach, Journ. f. Orn., 1871, p. 282; Reichenow, Journ. f. Orn., 1877, p. 255 (Cuba); Cory, Auk IV, 1887, p. 327 (Cuba); Birds West Indies, 1889, p. 248 (Cuba); Cat. West Indian Birds, 1892, p. 90 (Cuba); Maynard, Cat. Birds West Indies, 1898, p. 4 (Cuba).

A[*rdea*]. *brunnescens* Reichenow, Journ. f. Orn., 1877, p. 277; Ridgway, Man. North Amer. Birds, 1887, p. 131 (Cuba); *ibid*, ed. 2, 1895, p. 131 (Cuba); *ibid*, ed. 4, 1900, p. 131 (Cuba); Cory, List Birds West Indies, 1885, p. 28 (Cuba); *ibid*, rev. ed., 1886, p. 28 (Cuba).

Ocniscus brunnescens Cabanis, Journ. f. Orn., 1856, p. 344 (Cuba); Brewer, Proc. Bost. Soc. Nat. Hist., VII, 1860, p. 308 (Cuba);

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* Bull. Mus. Comp. Zool., XLVI, September, 1905, pp. 142–144.

Gundlach, Journ. f. Orn., 1875, p. 308 (Cuba); Contrib. Ornit. Cubana, 1876, p. 156 (Cuba).

[*Ocniscus*] *brunnescens* Gundlach, Repert. Fisico-Nat. Cuba, I, 1866, p. 350 (Cárdenas, Cuba).

Butorides brunnescens Baird, Rep. Explor. and Surv. R. R. Pac., IX, 1858, p. 677 (Cuba; in text); Cat. Amer. Birds, 1859, p. 13, No. 494; Birds North Amer., 1860, p. 677 (Cuba; in text); Lawrence, Ann. New York Lyc. Nat. Hist., VII, 1860, p. 271 (Cuba); Newton, Ibis, 1861, p. 275 (in text); Allen, Bull. Nutt. Orn. Club, V, 1880, p. 88 (in text); Ridgway, Proc. U. S. Nat. Mus., III, 1880, pp. 214, 237; Bull. U. S. Nat. Mus., No. 21, 1881, pp. 60, 83; Gundlach, Ornit. Cubana, 1893 (1895), p. 189 (Cuba); Bangs and Zappey, Amer. Nat., XXXIX, Apr., 1905, p. 188 (Isle of Pines); Thayer and Bangs, Bull. Mus. Comp. Zool., XLVI, No. 8, Sept., 1905, p. 142 (Cuba; in text).

B[*utorides*]. *brunnescens* Ridgway, in Baird, Brewer, and Ridgway, Water Birds North Amer., I, 1884, p. 49 (Cuba).

[*Butorides*] *brunnescens* Sharpe, Hand-List Gen. Spec. Birds, I, 1899, p. 200 (Cuba).

[*Ocniscus* (*Butorides*)] *brunnescens* Gundlach, Journ. f. Orn., 1861, p. 338 (Cuba).

[*Ardea* (*Butorides*)] *brunnescens* Gray, Hand-List Gen. Spec. Birds, III, 1871, p. 32 (Cuba).

Chars. sp.—Similar to *Butorides virescens* from Cuba, but entire neck purplish maroon, usually duller, without trace of a median lighter stripe or blackish streaks—only the chin paler, but this never white; posterior lower parts usually darker and more brownish; edge of wing with outer under wing-coverts not broadly creamy or buffy white, but blackish or brownish slate color, with only a *very* narrow whitish or buffy line along the extreme margin; edgings of superior wing-coverts either obsolescent or so deeply tawny as to be very inconspicuous, thus, at a little distance, giving the impression of their absence; bill usually all black; naked skin above lores also black, instead of whitish.

Description.—Adult male, No. 172,719, U. S. Nat. Mus.; Nueva Gerona, Isle of Pines, West Indies, July 2, 1900; W. Palmer and J. H. Riley. Pileum, occipital crest, postocular region, and a short sub-auricular streak, deep, somewhat bluish, glossy bottle green; rest of sides of head, with neck all around, purplish chestnut, the chin paler—light tawny ochraceous, the lower jugulum slightly paler and glaucous; upper surface of body deep, dull bottle green, the long, pointed, plume-like feathers of back and scapulars glaucous and somewhat bluish; wing-quills fuscous, the outer webs glossed with dull bluish green; all the superior wing-coverts somewhat glossy, bluish bottle green, more or less margined inconspicuously with tawny and chestnut; tail dark, bluish bottle green, somewhat glossy; posterior lower parts and lining of wing brownish slate gray, the thighs more rufescent.

Measurements.—Male:* Wing, 171 mm.; tail, 64; exposed culmen, 61; height of bill at base, 12; tarsus, 49; middle toe without claw, 39.

Female:† Wing, 163.5; tail, 61; exposed culmen, 60; height of bill at base, 11.2; tarsus, 48.8; middle toe without claw, 42.8.

Type locality.—Cuba.

Geographical distribution.—Cuba and the Isle of Pines.

This species is apparently about the size of the Cuban form of *Butorides virescens*, though the female seems to be appreciably smaller than the male. Seasonal and individual variation are slight.

The young bird in juvenal plumage differs from the adult much less than in *Butorides virescens*, but it is rather lighter and more rufescent below, particularly on the whole neck and sides of head; lower posterior surface less uniform; chin, cheeks, and median line of throat, jugulum, and breast streaked more or less with blackish and buffy—on throat, jugulum, and breast the shaft streaks are buffy, bordered on each side with dark earthy brown; upper surface of body duller, more greenish (less bluish); and the edgings of upper wing-coverts are much broader.

The specimens of *Butorides brunescens* examined are from Guama and other unspecified localities in Cuba, and from Nueva Gerona, in the Isle of Pines.

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* U. S. Nat. Mus., No. 172,179; Nueva Gerona, Isle of Pines, July 2, 1900; W. Palmer and J. H. Riley.

† U. S. Nat. Mus., No. 172,720; Nueva Gerona, Isle of Pines, June 30, 1900; W. Palmer and J. H. Riley.

Vol. XXV, pp. 57-58 **April 13, 1912**

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

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TWO NEW AMERICAN PIKAS.

BY N. HOLLISTER.

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Specimens of the two new species of *Ochotona* herewith described have been in the collection of the United States National Museum for many years. The recent acquisition of relevant material and the identification of all the American specimens in the group, have shown the necessity of recognizing additional forms.

Ochotona levis sp. nov.

Type from Chief Mountain Lake, Montana. Adult ♀, skin and skull. U. S. National Museum, No. $\frac{12000}{22241}$. Collected August 24, 1874. Dr. Elliott Coues. Orig. No. 4593.

General characters.—Size small; skull decidedly smaller than that of ***Ochotona princeps, O. cuppes***, or ***O. saxatilis***. Coloration most like ***O. princeps;*** but fresh coat, especially on cheeks and sides, lighter, with more yellowish-buff.

Color.—Head and upperparts of body light buffy brown, paler on nape: cheeks and sides of neck brighter rufous; area behind ears light buff. Color of back blending through lighter brownish-buff of sides to cream buff of underparts; breast often washed with rufous. Hands, above and below, cream buff; feet buff above, with soles somewhat dusky.

Skull smaller than in any of the neighboring forms.

Measurements of type.—Head and body, 168 millimeters; tail vertebræ, 10. Skull of type compared with skull of adult female *Ochotona princeps* from head of Smoky River, Alberta, the latter in parentheses: Greatest length, 41.7 (44.2); condylobasal length, 39 (41.2); zygomatic breadth, 20.5 (21.6); nasals, 13.6 (14); alveolar length of upper tooth row, 8 (8.5).

Remarks.—Eight specimens of *Ochotona levis* are in the collection; five from the type locality, one from the Belt Mountains, Montana, and two from the Bitter Root Mountains, Idaho. The species is at once distinguishable from ***cuppes*** or ***princeps*** on the north, and from ***saxatilis*** on the south, by the small size of the skull, together with the slight, but constant color differences.

Ochotona uinta sp. nov.

Type from Uintah Mountains, Utah. Adult, skin only. U. S. National Museum, No. 9750. Collected September 28, 1870. F. V. Hayden. Orig. No. 567.

General characters.—Differs widely from *Ochotona cinnamomea* in the comparatively uniform color of the upperparts, without gray on head, shoulders, and ears. More generally brownish than *O. saxatilis*, with less yellowish-buff and black in coloration.

Color.—Upperparts from head to tail uniform clay color, finely lined with darker brown; head darker than back; underparts cream buff. Hands and feet yellowish buff. Ears dark brown, edged with buff and with tuft of buff colored hairs inside.

Remarks.—The peculiar color of this new species at once distinguishes it from all other American pikas. The close color resemblance to *Ochotona bedfordi* of Asia is remarkable. Three specimens from the type locality, all in full fall pelage, are at hand; but, unfortunately, all are without skulls. An old, faded, specimen from the Wasatch Mountains, Utah, is probably of the same form.

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TWO NEW MURINE RODENTS FROM TURKESTAN.

BY GERRIT S. MILLER, JR.

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Of the two new Asiatic rodents here described one has been represented in the collection of the United States National Museum for several years, the other was recently sent for determination by Mr. Oldfield Thomas.

Alticola phasma sp. nov.

Type.—Adult male (skin and skull) in British Museum. Collected on eastern side of Kara Korum Mts., Chinese Turkestan, at altitude of between 9000 and 10,000 feet., October 13, 1911, by D. Carruthers. Original number, 333.

Diagnosis.—Externally like *Alticola albicauda* (True), but color more pallid, not appreciably different from that of *A. acrophilus*. Skull differing from that of *A. albicauda* in greater size of auditory bullæ and shorter diastema. Teeth as in *A. albicauda* (for figure see Proc. Acad. Nat. Sci. Philadelphia, 1899, p. 294) except that crown of m^3 is noticeably longer than that of m^2, and the third reentrant angle on outer side of same tooth is usually so well developed as to subtend an evident fourth salient angle.

Measurements.—External measurements of type and of a second adult male (No. 174,696 U. S. National Museum): head and body, 101 and 101; tail, 40.5 and 38; hind foot, 20 and 19.5; ear, 16 and 16; condylobasal length of skull, 27.0 and 26.8; zygomatic breadth, 14.8 and 15.0; interorbital constriction, 4.0 and 4.0; occipital breadth, 12.6 and 12.4; occipital depth, 7.0 and 7.0; nasal, 8.0 and 8.0; diastema, 8.2 and 8.2; mandible, 17.2 and 17.4; maxillary toothrow, 6.4 and 6.2; mandibular toothrow, 6.2 and 6.0.

Specimens examined.—Five, all from the type locality.

Remarks.—In this animal the pallid color of *Alticola acrophilus* is combined with an extreme form of the complicated enamel pattern of *A. albicauda*, to which peculiarities are added the large auditory bullæ, and the long crown of m^3, neither of which is found in the related species.

In all five skulls of *A. phasma* the posterior border of the palate resembles that of *Evotomys* on account of the breadth and definiteness of the lateral bridges. In the type and only known specimen of *A. albicauda*, however, there is no terminal shelf, since the lateral bridge on each side is represented by its two extremities only, between which the lateral groove lies widely exposed.

Apodemus microtis sp. nov.

Type.—Young adult male (skin and skull), No. 155,471, U. S. National Museum. Collected in the vicinity of Dzharkent, Russian Turkestan, November 11, 1909, by W. Rückbeil. Original number, 12.

Diagnosis.—Size, general appearance, skull and teeth as in *Apodemus sylvaticus sylvaticus*, but tail shorter than head and body, and ear reduced as in *A. hebridensis*.

Color.—The color resembles that of the more pallid individuals of true *Apodemus sylvaticus*, showing no evident trace of russet suffusion; grayish area behind ear and across neck and shoulders rather noticeable.

Measurements.—Head and body, 90 (85);* tail, 70 (75); hind foot, 21.4 (20.4); hind foot without claws, 21 (20); ear (wet), 13.6 (13.6); condylobasal length of skull (teeth moderately worn), 22.4; zygomatic breadth, 12.6; interorbital constriction, 4.0; breadth of braincase, 11.6; depth of braincase, 7.8; nasal, 9.0; diastema, 6.2; mandible, 13.4; maxillary toothrow, 3.6; mandibular toothrow, 3.2.

Specimens examined.—Two, both from the type locality.

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* Measurements in parentheses are those of a second male (No. 155,469).

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PROCEEDINGS

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NEW GENERA AND SPECIES OF NORTH AMERICAN THYSANOPTERA FROM THE SOUTH AND WEST.

BY J. DOUGLAS HOOD

Bureau of Biological Survey, U. S. Department of Agriculture.

The present paper adds to the known Thysanopterous fauna of North America four new genera and six new species, while three species and one variety are relegated to synonomy. This latter is not surprising in view of the number of workers who have described species after but little work on the group.

Our knowledge of the western and southern Thysanoptera was in 1908 limited to a paper by Dudley Moulton on the Californian species.[*] One year later, however, Mr. D. L. Crawford, then a student at Pomona College, Claremont, California, was a member of a party of two which made an entomological expedition to Guadalajara, Mexico; and after his return he described a supposed new genus and several new species.[†]

The new genus, to which he gave the name *Rhaptothrips*, has been suppressed by Bagnall,[‡] who directs attention to the fact that the form described is a nymph.

Another species, which Mr. Crawford described as *Liothrips mcconnelli*, belongs in the genus *Leptothrips* Hood,[§] as do *Criptothrips* (sic!) *californicus* Daniel[‖] and *Phyllothrips fasciculata* (sic!) Crawford.[¶] Furthermore, I can detect no differences whatever between a cotype of *mcconnelli* received from Mr. Crawford and two of Dr. Hinds' cotypes of *Cryptothrips aspersus*[*]—the type of the genus—in the collection of the United States National Museum.

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[*] U. S. Dept. Agr., Bur. Ent., Tech. Ser. 12, Pt. III, pp. 39-68; 1907.

[†] Pomona College Journal of Entomology, Vol. I, pp. 109-119; Dec., 1909; and Vol. II, pp. 153-170; March, 1910.

[‡] Ann. Soc. Ent. Belg., Tome LIV, p. 462; 1910.

[§] Ent. News, Vol. XX, p. 249; June, 1909.

[‖] Ent. News, Vol. XV, p. 293; Nov., 1904.

[¶] Pomona Coll. Journ. Ent., Vol. I, p. 105; Dec., 1909. The variety *stenoceps* Crawford (idem, p. 108) belongs in synonomy, having been erected for the reception of specimens of the typical form which had not become crushed in the mounting. The figure which he gives on p. 107 shows this fact very clearly.

Liothrips bakeri Crawford belongs in or near *Mesothrips* Zimmermann.[†]

Æolothrips vespiformis Crawford has been properly made the type of a new genus,—*Franklinothrips* Back.[‡]

Anthothrips variabilis Crawford (of which I have ten cotypes) is identical with the type of *A. gowdeyi* Franklin [§] in the collection of the United States National Museum; the species should be known as *Haplothrips gowdeyi* (Franklin). It is interesting to compare Dr. Franklin's figure of the head and prothorax (Pl. LXIII, fig. 8) with that given by Crawford (Pom. Coll. Journ. Ent., Vol. II, p. 166, A).

Idolothrips angusticeps Crawford was compared at the time of its description with *Megalothrips* (?) *spinosus* Hood,[‖] to which it is only distantly related (being placed in a different family by Bagnall!), the existence of four North American congeners[¶] and five Central and South American ones[**] having been either overlooked or ignored by its describer. It is almost certainly synonymous with one of these.

Thrips abdominalis Crawford has been since redescribed under the name *Thrips femoralis* by P. R. Jones,[††] of the Bureau of Entomology, notwithstanding the fact (as I have been reminded by Mr. H. M. Russell) that the latter name was used by Blanchard in 1851 for a species from Chile.[‡‡]

The collection upon which are based the new generic and specific names herein proposed was made four years ago in southern Texas and northern Mexico by Mr. Charles A. Hart, Systematic Entomologist of the Illinois State Laboratory of Natural History. Many hundreds of specimens were taken, all of which, through Mr. Hart's generosity, are in my private collection. In a previous paper, published in these Proceedings, two of the new species were described and assigned to a genus previously unknown from the United States; one of these was named *Diceratothrips harti* in recognition of its collector.

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[*] Proc. U. S. Nat. Mus., Vol. XXVI, p. 205; 1902.

[†] Bull. de l'Institut Botanique de Buitenzorg, No. VII, p. 12; 1900.

[‡] Ent. News, Vol. XXIII, p. 73; Feb., 1912.

[§] Proc. U. S. Nat. Mus., Vol. XXXIII, p. 724; March 4, 1908.

[‖] Can. Ent., Vol. XL, p. 306; Sep., 1908.

[¶] *Coniferarum* Pergande, and *flavipes*, *armatus*, and *tuberculatus*, Hood.

[**] *Schötti* Heeger, and *longiceps*, *assimilis*, *affinis*, and *foveicollis*, Bagnall; the last mentioned has been recently removed by Bagnall to the genus *Dicaiothrips* Buffa and separated into two species, *foveicollis* and *championi*.

[††] U. S. Dept. Agr., Bur. Ent., Tech. Ser. 23, Pt. I, p. 4; Jan. 26, 1912.

[‡‡] Historia fisica y politica de Chile, Zool., Tomo VI, p. 150.

Mrs. E. C. Green (nee L. M. Hart) is to be thanked for her careful outlines and first washes of the two species illustrated in the accompanying plate.[*] And, as usual, Mr. R. S. Bagnall, the English Thysanopterist, has aided in comparing certain species with the types of Old World genera.

Suborder TEREBRANTIA Haliday.

Family ÆOLOTHRIPIDÆ Haliday.

Stomatothrips gen. nov.

(*στόμα*, mouth; *θρίψ*, a wood worm.)

Head short, distinctly wider than long, broadly received into prothorax, and produced between the non-projecting eyes. Antennæ nine-segmented, moderately slender, inserted very close together; segments 7–9 more or less compactly united. Maxillary palpi clearly eight-segmented; labial palpi five-segmented, the basal segment very short. Prothorax wider than long, slightly longer than head; posterior margin without strong spines. Fore tibiæ unarmed;[†] second fore tarsal segment with the usual hook-like appendage. Fore wings expanded apically, where they are twice as broad as near base. Abdomen very broad at segments 5 and 6, subpetiolate; ninth abdominal segment of male not prolonged at the posterior angles into hooked, clasping organs.

Type: Stomatothrips flavus sp. nov.

This genus resembles *Orothrips* and *Erythrothrips*, Moulton, in the increased number of segments of the maxillary and labial palpi[‡] and in that the ninth abdominal segment of the male is simple. From both it differs in the exact number of palpal segments and in having wings which are expanded apically; furthermore, the antennal segments are free in *Orothrips*, and in *Erythrothrips* the head is elongate and of different structure anteriorly.

That such genera as *Orothrips*, *Erythrothrips*, and *Stomatothrips* have been found only in North America is of especial interest because of the

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[*] The true light and shade relation has been lost to a great degree in the reproduction of the original drawings, due to the use of an inferior quality of Chinese white.

[†] Moulton states that *Orothrips* has "all tibiæ armed" (Tech. Ser 12, Part III, Bur. Ent., U. S. Dept. Agr., p. 45) but his figures contradict this statement (Pl. I, figs. 1 and 4). For a drawing of an armed tibia see Uzel, "Monographie der Ordnung Thysanoptera." Tab. V, fig. 38.

[‡] Moulton, in his generic description of *Erythrothrips* (Tech. ser 21, Bur. Ent., U. S. Dept. Agr., p. 35), gives the number of segments in the labial palpi as three; but twenty-two lines below, in his description of the type species, states, "labial palpi four segmented."

light which it seems to throw on the evolution of the Thysanoptera. These genera probably represent the most primitive known members of the order; for in no group of insects does specialization result in an increase in the number of segments either in the body or its appendages. *Stomatothrips* is thus best placed at the beginning of the Æolothripidæ, possessing as it does more palpal segments than any other known genus.

In an ancient type we would expect to find broad wings; and this is actually the case. Although the palpi of *Palæothrips fossilis* Scudder,* a Tertiary species described from the White River deposits of Utah, are unfortunately unknown, it is interesting to note that the fore wings are broad and similar in venation to those of *Stomatothrips*, though a little wider in proportion to their length.

Carrying these generalizations a little further,—if we may safely do so on such scant evidence,—we are led to the conclusion that the order Thysanoptera originated in or near the tropics of the New World. And early in its evolution it seems that a branch diverged to form the Urothripidæ (at present known only from the Old World) which, having in the course of their adaptation lost the ovopositor they at one time possessed, naturally approach the Tubulifera in general appearance. Mr. Bagnall has already noted† that in many fundamental characteristics the Terebrantia and Tubulifera resemble each other more closely than do the Urothripidæ and Phlœothripidæ; but he nevertheless assigns the family Urothripidæ to the Tubulifera. In my opinion the family should be made the type of a new sub-order abundantly distinguished by the presence of eleven instead of four spiracular openings—certainly a character of high taxonomic value in view of its constancy in the two sub-orders at present recognized.

Stomatothrips flavus sp. nov.

Fig. 1, *a* and *b*.

Female.—Length about 1.6 mm. (1.47–1.77 mm.). Color testaceous, head and prothorax slightly darker; pterothorax with an indistinct, V-shaped, brown cross-band at middle of dorsum; abdomen with faint indications of a pale cross-band on segments 1, 2, and 3; antennal segments 1–4 pale yellowish white, the remainder of antenna black; tibiæ shaded with black.

Head about one and one-fourth times as wide as long, rather deeply sulcate between antennæ, and slightly narrower and shorter than prothorax; cheeks slightly arcuate; dorsal and lateral surfaces faintly transversely striate, set with numerous minute spines. Eyes large, pilose, posteriorly prolonged on ventral surface, and with large, distinct facets. Ocelli equidistant. Antennæ moderately slender, about as long as combined lengths of head, pro- and mesothorax; segment 1 broadest, nearly as wide as long, tapering toward apex; 2 distinctly longer and narrower than 1; 3–6 long, cylindrical, successively decreasing in length, 4 distinctly shorter than 3; 7 slightly longer than 6, usually about equal to 5 in length, and narrowing apically; 8 abruptly shorter, one-half to one-third as long as 7 and twice to five times as long as 9, which is subconical and usually about as long as wide. Segments 1–4 pale yellowish white, 3 and 4 slightly more whitish, 4 clouded at extreme apex with black; 5–9 uniform black. Segments 3–9 quite thickly clothed with short, white, inconspicuous hairs of uniform length; 5, 6, and 7 each with a short, linear, pale, sensory area on ventral surface.* Mouth cone normal to the group. Ventral surface of head sparsely pubescent and with two pairs of prominent spines, one of which is subantennal and the other of which is situated between the posterior angles of the eyes, just anterior to the chitinous thickening.

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* Proc. Bost. Soc. Nat. Hist., Vol. XI, p. 117, 1867; Geol. Mag., First Series, Vol. V, p. 221, 1868; Bull. U. S. Geol. Surv. Terr., I, p. 222, 1875.

† Proceedings International Entomological Congress, II, 283–288; 1911.

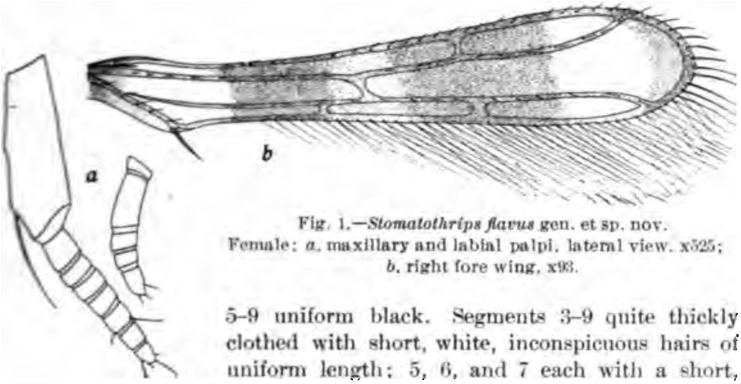

Fig. 1.—*Stomatothrips flavus* gen. et sp. nov. Female: *a*, maxillary and labial palpi, lateral view, x525; *b*, right fore wing, x93.

Prothorax subrectangular, slightly wider than long, and a little wider than head; sides and posterior angles rounded; surface with numerous very minute spines. Mesothorax broader than prothorax, anterior angles broadly rounded, mesonotum transversely striate. Metathorax narrowed posteriorly, metanotum nearly smooth. Wings long; fore wings expanded apically, broadest at apical sixth, where they are just twice as wide as at basal fourth; venation normal to the group; spines on anterior portion of ring vein short, slightly projecting beyond margin of wing; first and second longitudinal veins set with about 20 and 14 short spines, respectively. Color of fore wings pale brown, with two white cross bands, one of these being a narrow one at basal seventh and the other a slightly wider one at apical seventh; intermediate brown area somewhat paler at middle; hind wings white.

Abdomen subpetiolate, at sixth segment more than twice as wide as at base and one and one-half times as wide as pterothorax; posterior margin of segments 1, 2, and 3 whitish; segments 9 and 10 tinged with yellow or white.

Measurements of a female from Odin, Illinois.—Length, 1.73 mm.; head, length, .17 mm.; width, .21 mm.; prothorax, length, .21 mm.; width, .24 mm.; pterothorax, width, .30 mm.; abdomen, width, .47

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* Similar areas are almost certainly present on segments 3 and 4, but I have not been able to make them out on my specimens.

mm. Antennal segments: 1, 39μ; 2, 48μ; 3, 162μ; 4, 141μ; 5, 75μ; 6, 62μ; 7, 66μ; 8, 23μ; 9, 12μ; total, .63 mm.; width, .025 mm.

Measurements of a female from Monterey, Mexico.—Length, 1.47 mm.; head, length, .15 mm.; width, .21 mm.; prothorax, length, .20 mm.; width, .23 mm.; pterothorax, width, .30 mm.; abdomen, width, .35 mm. Antennal segments: 1, 33μ; 2, 56μ; 3, 132μ; 4, 93μ; 5, 67μ; 6, 49μ; 7, 52μ; 8, 25μ; 9, 14μ; total, .517 mm.; width, .025 mm.

Male.—Similar to female, but slenderer and with longer antennæ.

Measurements of a male from Monterey, Mexico.—Length, 1.07 mm.; head, length, .147 mm.; width, .174 mm.; prothorax, length, .160 mm.; width, .181 mm.; pterothorax, width, .245 mm.: abdomen, width, .192 mm. Antennal segments: 1, 36μ; 2, 45μ; 3, 154μ; 4, 137μ; 5, 92μ; 6, 77μ; 7, 78μ; 8, 24μ; 9, 8μ; total, .65 mm.; width, .027 mm.

Measurements of antenna of male from Brownsville, Texas:—1, 31μ; 2, 39μ; 3, 118μ; 4, 106μ; 5, 75μ; 6, 67μ; 7, 75μ; 8, 17μ; 9, 8μ; total, .54 mm.; width, .027 mm.

Described from a good series of both sexes as follows: Monterey, Mex., July 5, 1908, C. A. Hart; Matamoras, Mex., June 30, 1908, C. A. H.; "Tlahualilo, Mex., Sep. 12, 1910, on cotton, J. P. Conduit" (Coll. A. C. Morgan); Brownsville, Texas, June 23, 25; July 2, 1908, C. A. H.; Dubois, Illinois, July 2, 1909, C. A. H.; Odin, Illinois, June 25, 1909, C. A. H. It appears to be common on grass and weeds, as all of Mr. Hart's collections were by sweeping.

Type locality.—Monterey, Mexico.

The pale coloration will distinguish this species at a glance.

No drawing of the head and prothorax is given because in a large series of carefully mounted specimens I have been unable to find a perfectly satisfactory dorsal view. The structure of the insect is entirely responsible for this. I have experienced the same difficulty in mounting *Franklinothrips vespiformis.*

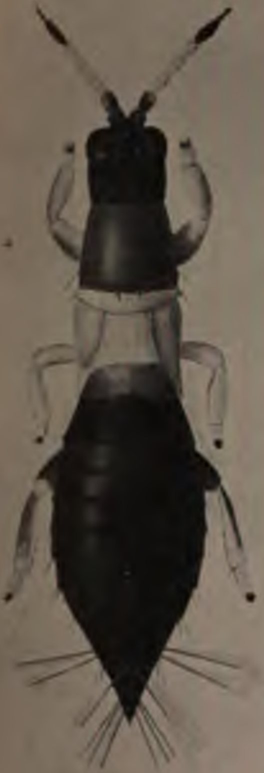
FAMILY THRIPIDÆ HALIDAY.

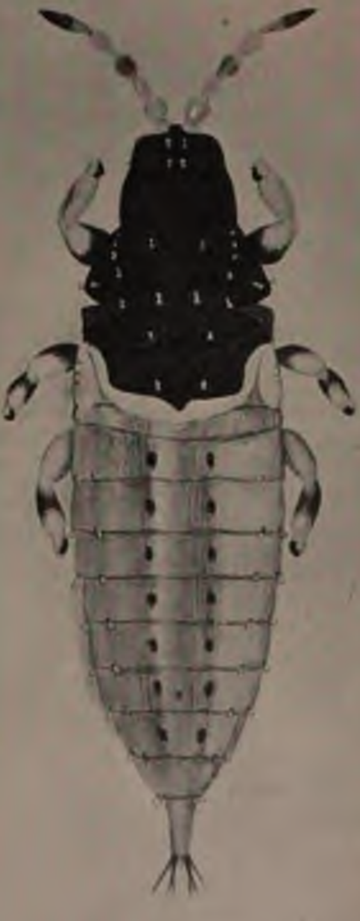
BREGMATOTHRIPS gen. nov.

(*βρέγμα*, the upper part of the head; *θριψ*, a wood worm.)

Head long; vertex swollen, produced, overhanging and slightly surpassing the base of antennæ. Eyes prominent, protruding. Antennæ eight-segmented, style much shorter than segment 6; all sense cones simple. Maxillary palpi three segmented. Prothorax elongate, distinctly longer than head and nearly as long as wide, broadest near base; posterior angles with two long spines; all other prothoracic spines relatively small. Wings, when present, moderately slender and without color pattern; fore pair with two longitudinal veins reaching nearly to tip; anterior margin of fore wings set with very long and slender spines which are scarcely distinguishable from the fringe. Abdomen acute, the ninth segment elongate; spines long and strong; ninth abdominal segment of male not provided with two pairs of chitinous dorsal projections.

Type.—***Bregmatothrips venustus*** sp. nov.





L. M. Hart et J. D. H. del.

Bregmatothrips venustus,
Female, x77

Rhopalothrips bicolor,
Female, x104

This genus is suggestive of *Aptinothrips*, *Physopus* (s. l.), *Oxythrips*, and *Rhaphidothrips*. In it should be placed *Thrips binervis* Kobus,* a Javanese species differing from *venustus* in the much slenderer form and the longer head and prothorax.

In such genera of the Thripidæ as *Aptinothrips*, *Pachythrips*, *Prosopothrips*, *Apterothrips*, *Amblythrips*, and *Agerothrips* the ocelli and wings are always wanting; in *Chirothrips* and *Limothrips* the ocelli are present in the females but wanting in the wingless males; in the brachypterous form of the species described by Uzel as *Physopus nigriventris* only the two posterior ones are present; in the type species of the present genus the brachypterous form may have three, two, or no ocelli, while the macropterous form always has three. It will thus be seen that the presence of ocelli and wings are not even characters of specific significance and that their use in generic diagnoses can not be considered of any value whatever.

Bregmatothrips venustus sp, nov.

Plate IV, first figure; Fig. 2, *a* and *b*.

Female: forma brachyptera.—Length about 1.0 mm. Color dark blackish brown to black, with pterothorax, first abdominal segment, intermediate antennal segments, and legs, yellow, shaded slightly with brown; prothorax slightly paler than head.

Head about as long as wide, slightly shorter than prothorax; vertex swollen, produced anteriorly, broadly rounded as seen from above; dorsal surface faintly cross striate, armed with three pairs of moderately long slender bristles, the first pair situated opposite center of eyes, the second pair placed almost directly behind the posterior ocelli, and the third pair situated just behind the eyes. Eyes moderate in size, protruding, setose. Ocelli lacking or with the anterior one greatly reduced or wanting. Antennæ moderately slender, about 1.8 times as long as head; segments 1 and 2 brown, the latter paler toward apex and at middle; 3 to 5 pale yellow, sometimes slightly shaded with brown; 6–8 brown, concolorous with head; sense cones pale, slender, simple; formula: 3, 0–1; 4, 0–1; 5, 1–0; 6, 1–1+^{1}.

Prothorax very slightly broader than long and somewhat longer and wider than head; posterior angles each with two long, slender spines; anterior angles with a pair of smaller, weaker bristles about equal in size to the posterior marginal pair; all other spines small and scarcely visible. Mesothorax slightly wider than prothorax, fore angles broadly rounded; metathorax closely united to mesothorax and of about equal width throughout; meso- and metathorax uniform pale lemon yellow. Wings short, reaching to first abdominal segment. Legs rather short and stout, yellow in color; femora and bases of tibiæ, especially the posterior pair, often shaded with brown.

Abdomen moderately long, slender, distinctly broader than pterothorax;

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* I am indebted to Mr. A. C. Morgan for the privilege of examining a slide of this species in the collection of the Bureau of Entomology.

apex sharply conical; segment 10 with a longitudinal dorsal suture; spines on segments 9 and 10 long, strong, dark in color, and prominent. Segment 1 of abdomen pale yellow, concolorous with pterothorax; remainder of abdomen dark blackish brown, concolorous with or slightly darker than head and prothorax.

Measurements.—Length, 1.02 mm.; head: length, .135 mm.; width, .140 mm.; prothorax: length, .158 mm.; width, .180 mm.; pterothorax: width, .200 mm.; abdomen: width, .263 mm. Antennal segments: 1, 24μ; 2, 33μ; 3, 39μ; 4, 33μ; 5, 31μ; 6, 51μ; 7, 11μ; 8, 15μ; total, .237 mm.; width, .018 mm.

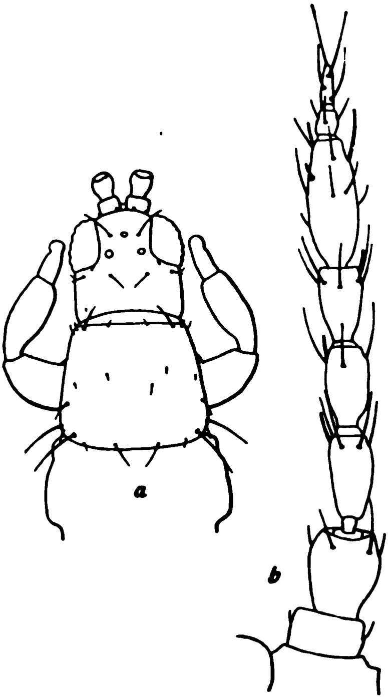

Fig. 2.—*Bregmatothrips venustus* gen. et sp. nov. Female: *a*, head and prothorax, *forma macroptera*, x106; *b*, left antenna, *forma brachyptera*, x384.

Female: forma macroptera.—Similar to *forma brachyptera*, differing as follows: Length about 1.1 mm. Color nearly uniform dark blackish brown, with pterothorax very slightly paler and with legs and intermediate antennal segments brownish yellow, the former shaded with brown or black.

Ocelli always present, subequal in size, equidistant.

Mesothorax distinctly broader than prothorax and metathorax. Wings long, nearly attaining tip of abdomen, very pale in color, shaded with a light wash of brownish; fore wings with two longitudinal veins reaching nearly to tip; anterior vein usually joined by two cross veins to the costa and with about nine pale bristles, of which two are usually near apex and six or seven near base; the posterior vein can usually be seen arising from the anterior at basal three-sevenths; it is set with eight or nine long spines of which the apical two are slightly more separated at base; hind wings slightly paler than fore wings.

First abdominal segment blackish brown.

Measurements.—Length, 1.14 mm.; head: length, .128 mm.; width, .141 mm.; prothorax: length, .164 mm.; width, .186 mm.; mesothorax: width, .233 mm.; metathorax, width, .203 mm.; abdomen: width, .270 mm. Antennal segments: 1, 23μ; 2, 32μ; 3, 36μ; 4, 33μ; 5, 32μ; 6, 54μ; 7, 10μ; 8, 14μ; total, .234 mm.; width, .018 mm.

Described from several females of both forms, as follows: Matamoras, Mexico, June 30, 1908, C. A. Hart; Brownsville, Texas, June 25 and 29, July 2 and 9, 1908, November 20, 1911, C. A. H.; Grand Tower, Illinois, July, C. A. H. and J. D. H.; Cobden, Illinois, June 27, 1909, C. A. H.

Type locality.—Brownsville, Texas.

The short winged form may easily be recognized, for the transverse band is visible to the naked eye. It occurred commonly in sweepings.

SUBORDER TUBULIFERA HALIDAY.

FAMILY PHLŒOTHRIPIDÆ UZEL.

Genus HAPLOTHRIPS Amyot et Serville, 1843.

Haplothrips graminis sp. nov.

Fig. 3.

Female.—Length about 1.5 mm. Color dark blackish brown to almost black, with a reddish cast due to the presence of maroon hypodermal pigmentation; fore tarsi, apical portion of fore tibiæ, and bases of intermediate antennal segments, yellow or yellowish.

Head somewhat longer than wide, broadest at middle; cheeks gently rounded, usually very slightly convergent posteriorly; vertex rounded, slightly produced, the anterior ocellus slightly overhanging; dorsal and lateral surfaces set with several short inconspicuous spines; postocular bristles rather short, pointed, less than one-third as long as head. Eyes slightly more than one-third as long as head, not protruding. Ocelli anterior; posterior ocelli opposite anterior third of eyes. Antennæ about one and one-half times as long as head, moderately stout; segments 1 and 2 dark blackish brown, the latter paler toward apex and at middle; 3 yellow, shaded laterally with brown; 4–8 successively darker in color, ranging gradually from brownish yellow to blackish brown; segment 3 subconical, swollen, very slightly narrower and shorter than segment 4; 4–6 subglobose, pedicellate, the first as broad as its length exclusive of pedicel; 7 oblong, pedicellate, truncate at apex, and broadly united to 8, which is subconical; sense cones short, moderately stout, those on segments 3 and 4 blunt; formula: 3, 0–1; 4, 2–2; 5, 1–1+^{1}; 6, 1–1; 7 with one on dorsum near apex. Mouth cone blunt, about half as long as head, slightly surpassing middle of prosternum.

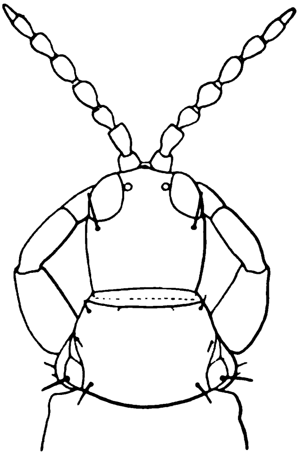

Fig. 3.
Haplothrips graminis sp. nov.
Female, head and prothorax, x96.

Prothorax a little more than two-thirds as long as head, and (including coxæ) about 1.8 times as wide as long, surface nearly smooth; anterior marginal spines greatly reduced in size and scarcely visible; others blunt, the two pairs at the posterior angles longest; midlaterals short. Pterothorax slightly wider than prothorax, about as broad as long, sides gently arcuate, slightly converging posteriorly. Wings present, clear; fore wings distinctly narrowed at middle, with a slight brownish cloud at extreme base, and with the subapical fringe on the posterior margin double for about seven hairs. Fore tarsi armed with a small, acute tooth.

Abdomen slightly wider than pterothorax. Tube rather short, less than .6 as long as head, about 1.7 times as long as its basal width, suffused with hypodermal pigmentation.

Measurements.—Length, 1.5 mm.; head: length, .200 mm.; width, .171 mm.; prothorax: length, .150 mm.; width (including coxæ), .266 mm.; pterothorax: width, .290 mm.; abdomen: width, .320 mm.; tube: length, .117 mm.; width, at base, .057 mm.; at apex, .032 mm. Antennal segments: 1, 33μ; 2, 39μ; 3, 37μ; 4, 42μ; 5, 39μ; 6, 36μ; 7, 36μ; 8, 25μ; total, .29 mm.; width, .029 mm.

Male.—Similar to female but slightly smaller (length about 1.2 mm.), and with slenderer antennæ.* Fore femora often swollen; fore tarsi armed with a rather large, stout tooth. Abdomen slender.

Described from a good series of both sexes taken by Mr. C. A. Hart at Brownsville, Loma, and on Padre Island opposite Pt. Isabel, Texas, and at Matamoras, Mexico, in June, July, and November. It was rather common in sweepings, and was once taken in flowers of *Clematis drummondii.*

Type locality.—Brownsville, Texas.

This species is very close to *H. gowdeyi* Franklin. But in a series of over thirty specimens the prothoracic and postocular bristles are always pointed and shorter, with the anterior marginals greatly reduced in size; the antennæ are always much darker in color; and there is no sense cone on the inner margin of the third antennal segment.

The figure given herewith was unfortunately made some time ago from a specimen which, though freshly-killed, had the head unusually narrowed at base.

SCOPÆOTHRIPS gen. nov.

(*σκωπαιος*, a dwarf; *θριψ*, a wood worm.)

Body very short, broad, compact. Head fully as broad as long, cheeks subparallel; front produced between eyes, separated from their anterior margin by a deep furrow, and bearing the anterior ocellus at its extremity. Mouth cone short, heavy, attaining fore margin of mesothorax. Antennæ eight-segmented, all segments free and of normal form. Legs short, stout; fore legs of male often greatly swollen, the femora serrate on inner margin and with a strong basal tooth; tarsi and inner apex of tibiæ each with a strong tooth in the male. Abdomen moderately large, broad at base, thence tapering to tube. All prominent bristles, excepting those at apex of tube, infundibuliform.

Type.—*Scopæothrips unicolor* sp. nov.

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* Trybom notes in his original description that this is true also of *H. bagnalli*.

To the present genus, which is probably best placed near *Haplothrips*, I have assigned a single, minute, wingless species remarkable for the very broad, infundibuliform bristles, the peculiar structure of the vertex, and the swollen, armed femur of the male.

Scopæothrips unicolor sp. nov.

Fig. 4, *a* and *b*.

Female: forma bracyptera.—Length about .9 mm. Color dark blackish brown, pterothorax often paler when viewed by reflected light; tarsi, apices of fore tibiæ, and antennal segments 3–6, yellow. Dorsal surface sculptured, shining.

Head slightly wider than long; cheeks subparallel, with a short, collar-like widening at base; dorsal and lateral surfaces with deep, close, transverse striæ and short stout spines; postocular bristles short, infundibuliform, similar in size and shape to a pair at the posterior angles of the eyes. Eyes rather coarsely faceted, with occasional brief spines between facets. Posterior ocilli directed antero-laterally. Antennæ slender, slightly more than twice as long as head; segments 1, 2, 7, and 8 concolorous with body, excepting apex of 2, which is distinctly yellowish; 3–6 uniform pale yellow, clavate, pedicellate; 7 oblong, pedicellate; 8 subconical; sense cones moderately stout, almost perfectly transparent; formula: 3, 0–0; 4, 1–1; 5, 1–1+^{1}; 6, 1–1; 7 with one on dorsum near apex.

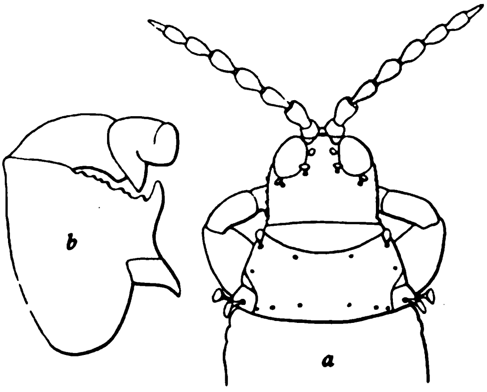

Fig. 4.—*Scopæothrips unicolor* gen. et sp. nov. *a*, head and prothorax, female. x93; *b*. right fore leg, male, ventral view, x283.

Prothorax about .7 as long as head and (including coxæ) about two and one-half times as wide as long; all usual spines present, very short and broadly infundibuliform;* coxal spine wine-glass-shaped as seen from above; dorsal surface at each side with a depressed and concentrically striate area which is lobed mediad; remainder of dorsal surface transversely striate. Pterothorax large, broader than prothorax, subrectangular; mesonotum closely transversely striate (the striæ bent posteriorly at the median line) and with two pairs of dilated equidistant bristles on posterior edge; metanotum with a pair of similar bristles at middle (about

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* The bristles are all pale and transparent, and in balsam mounts visible under high power only after a very careful adjustment of the light. In the figure the bases of several have been shown although the bristles themselves could not be distinguished against the dark-colored notum. This is true also of *Rhopalothrips bicolor* sp. nov.

as far separated as those of mesonotum) and with very close longitudinal striæ. Legs stout; fore tarsi armed with a moderately long, acute tooth. Wings attaining first abdominal segment, the three subbasal spines infundibuliform.

Abdomen broadest at segment 2, thence tapering almost straight to tube. Tube between .6 and .7 as long as head, less than twice as wide at base as at apex; sides straight. Marginal and internal abdominal bristles very short, enormously dilated, the former curving posteriorly; bristles at apex of tube short, pointed.

Measurements.—Length, .92 mm.; head: length, .14 mm.; width, .15 mm.; prothorax: length, .10 mm.; width (inclusive of coxæ), .25 mm.; pterothorax, width, .27 mm.; abdomen: width, .30 mm.; tube: length, .09 mm.; width at base, .053 mm.; at apex, .029 mm. Antennal segments: 1, 21μ; 2, 36μ; 3, 39; 4, 42μ; 5, 42μ; 6, 39μ; 7, 36μ; 8, 29μ; total, .285 mm.; width at segment 4, .025 mm.

Male: forma brachyptera.—Slightly shorter than female; fore legs usually greatly enlarged, the femora serrate on inner margin and with a strong basal tooth; fore tibia with stout, blunt tooth on inner margin of apex; tarsal tooth very strong.

Paratype: No. 14,693, U. S. National Museum.

Described from an excellent series of both sexes, taken during June and July on *Opuntia*, at Brownsville, Texas, by Mr. Charles A. Hart.

This interesting species is the smallest known Tubulfiferon. In living specimens the enormously dilated bristles appear as minute white dots.

RHOPALOTHRIPS gen. nov.

(*ῥόπαλον*, club; *θριψ*, a wood worm.)

Body very short, broad, compact. Head as broad as long, widest in basal third, narrowed anteriorly; eyes scarcely extending onto ventral surface. Mouth cone short, heavy, attaining fore margin of mesothorax. Antennæ eight-segmented, the last three segments compactly united; second segment subglobose, conspicuously widened; third segment short and conspicuously narrower; antennal spines and sense cones very slender and weak. Legs short, stout. Abdomen moderately large, broad. All prominent body bristles, excepting those at apex of tube, infundibuliform.

Type.—*Rhopalothrips bicolor* sp. nov.

It is difficult to say just where in our present classification this genus should be placed. The union of the three apical segments of the antennæ suggests *Dermothrips hawaiiensis* Bagnall and *Cephalothrips monilicornis* Reuter, and other points of structure would seem to indicate relationship with the genus *Haplothrips*. It probably belongs in the *Haplothrips-Zygothrips-Cephalothrips-Hindsiana* series with *Scopæothrips* gen. nov.

In the preceding generic description I have abandoned the use of presence or absence of ocelli and wings, because such characters are of no value even as specific ones. In certain Phlœothripid genera, such as *Trichothrips* Uzel and *Allothrips* Hood, whose species live under bark or in other secluded places, the ocelli are lacking in apterous or brachypterous generations and present in macropterous ones; while in the genera which constitute the main bulk of the family and whose species do not spend their lives in hidden places, the ocelli are always, and the wings usually, present. It is interesting to note, however, that the reduction of the eyes and the absence of ocelli can not always be ascribed to a decrease in the light intensity, for this wingless species has no ocelli, yet lives exposed to the rays of a tropical sun on the leaves of an intensely xerophilous plant.

Rhopalothrips bicolor sp. nov.

Plate IV, second figure; fig. 5, *a* and *b*.

Female: forma brachyptera.—Length about .9 mm. Head, prothorax, meso- and metanotum black; abdomen and metapleuræ white, segments 2-8 of the former each with a pair of small granulate black dots on dorsum; legs white, the tibiæ of second and third pairs banded with black, anterior and middle femora black at base; antennæ white, segments 4 and 6-8 dusky, the last two especially so. (By transmitted light the heavy white pigment often appears nearly black, in some specimens almost reversing the coloration as described above.) Dorsal surface non-shining, densely granulate in dark colored portions, the granules tending to coalesce into lines of reticulation; ventral surface smooth.

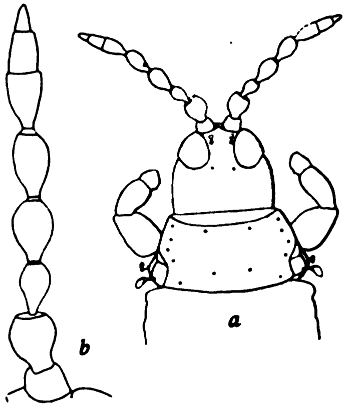

Fig. 5.
Rhopalothrips bicolor gen. et sp. nov.
Female; *a*, head and prothorax, x93;
b, right antenna, x286.

Head slightly wider than long, widest in basal third and narrowed toward eyes, with a median carina above insertion of antennæ; dorsal and lateral surfaces sparsely spinose with brief, transparent, pointed spines; postocellar bristles large, dilated; a second pair of prominent bristle-insertions visible at inner posterior angle of eyes; postocular bristles wanting. Eyes with coarse, separated facets, between which are minute, stout spines. Ocelli wanting. Antennæ short, stout, about twice as long as head; segments 1, 2, 3, and 5 nearly white; 1 and 5 slightly darkened with yellowish; 4 and 6 dusky brown, the former paler at apex, the latter paler at base; 7 and 8 uniform blackish brown; segment 2 subglobose, pedicellate, conspicuously the broadest in entire antenna; 3 short, slender, claviform, conspicuously narrower and weaker than 4; 4 and 5 clavate, pedicellate; 6-8 successively shorter, together forming a compact, pedicellate club; sense cones and spines exceedingly small and weak; segment 2 with a broad, infundibuliform bristle on inner side of dorsum; segment 3 without sense cones.

Prothorax about .7 as long as head and (inclusive of coxæ) approximately two and a half times as wide as long; all usual spines present, very short and broadly infundibuliform;* coxal spine wine-glass-shaped as seen from above; dorsal surface at each side with a broad, shallow fovea. Pterothorax large, broader than prothorax, subrectangular; meso- and metanotum each with one pair of large, dilated bristles near posterior margin. Legs stout; fore tarsi armed each with a minute, acute tooth. Wings attaining first abdominal segment, the three subbasal spines infundibuliform.

Abdomen slightly broader than pterothorax, heavy, roundly narrowed to tube. Tube a little more than .6 as long as head, less than twice as wide at base as at apex, sides straight. Marginal and internal abdominal bristles very short, enormously dilated, the former curving posteriorly; bristles at apex of tube short, pointed.

Measurements.—Length, .93 mm.; head: length, .126 mm.; width, .144 mm.; prothorax: length, .090 mm.; width (including coxæ), .224 mm.; pterothorax: width, .240 mm.; abdomen: width, .270 mm.; tube: length, .079 mm.; width at base, .044 mm.; at apex, .026 mm. Antennal segments: 1, 21μ; 2, 35μ x 32μ; 3, 27μ x 18μ; 4, 33μ x 25μ; 5, 36μ; 6, 35μ; 7, 24μ; 8, 18μ; total length of antenna, .23 mm.

Paratype: No. 14,694, U. S. National Museum.

Described from forty-nine females taken July 4, 1908, on *Opuntia* at Topo Chico (near Monterey), Mexico, by Mr. Charles A. Hart.

With the exception of *Cryptothrips dentipes* Reuter, which has a pale prothorax, this is the only bicolored species of the suborder.

Genus LIOTHRIPS Uzel, 1895.

Liothrips varicornis sp. nov.

Fig. 6, *a* and *b*.

Female.—Length about 2.1 mm. Color dark blackish brown or black; tarsi, articulations of legs, apices of antennal segments, and tip of tube paler; third antennal segment abruptly pale yellow.

Head about one and one-fifth as long as wide, broadest across cheeks: the latter gently arcuate, slightly converging posteriorly; vertex elevated, produced, anterior ocellus distinctly overhanging; dorsal and lateral surfaces finely transversely striate, set with several short, inconspicuous spines; postocular bristles pointed, about as long as eyes. Eyes large, finely faceted, not at all protruding, one-third as long as head. Ocelli anterior; posterior ocelli opposite anterior third of eyes. Antennæ twice as long as head, moderately slender; segments 1 and 2 nearly concolorous with body, 2 slightly paler toward apex and at middle; 3 pale yellow, slightly clouded apically; 4–8 nearly concolorous with body, slightly paler at apex; segments 3–6 clavate, pedicellate; 7 oblong, pedicellate; 8 subconical; sense cones slender, colorless; formula: 3, 0–1; 4, 1-1+^{1}; 5, 1-1+^{1}; 6, 1-1+^{1}; 7 with one on dorsum near apex. Mouth cone acute, slightly surpassing base of prosternum.

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* See note under *Scopæothrips unicolor*, p. 71.

Prothorax two-thirds as long as head, and (including coxæ) about 2.3 times as wide as long; all spines present, long, pointed, brown in color, the two pairs near the posterior angles longest; coxal spine pointed, a little shorter than the anterior marginals. Pterothorax slightly wider than prothorax and a little wider than long; sides subparallel, slightly converging posteriorly. Wings long, closely fringed, not narrowed at middle; fore wings margined with a slight shading of brown and with a narrow, median brown bar originating just beyond the three subbasal spines and becoming obsolescent before apex of wing; subbasal spines set in a narrow, dark brown, longitudinal vitta; subapical fringe on posterior margin double for about fourteen hairs; hind wings clear. Legs not long, a little stouter than usual in the genus; fore tarsi unarmed.

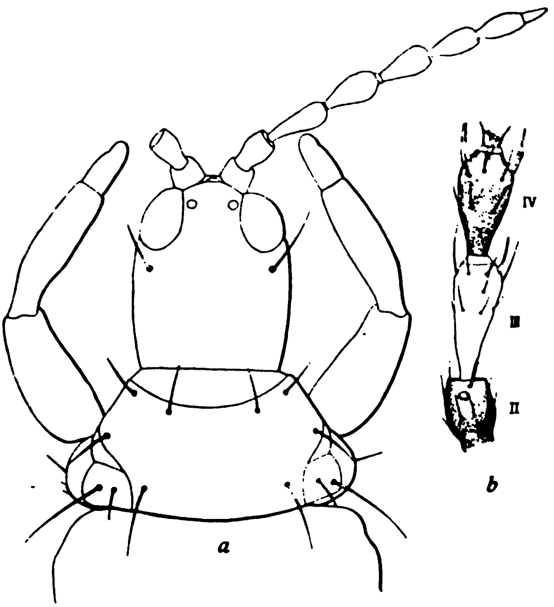

Fig. 6.—*Liothrips varicornis* sp. nov. Female, holotype:
a, head and prothorax, x91;
b, segments II–IV of right antenna, x172.

Abdomen large, slightly wider than pterothorax, tapering roundly from segment 6 to base of tube. Tube about .9 as long as head, twice as wide at base as at apex, tapering evenly for its entire length. Abdominal bristles moderately long, pointed, pale; terminal bristles slightly shorter than tube.

Measurements.—Length, 2.13 mm.; head: length, .270 mm.; width, .221 mm.; prothorax: length, .180 mm.; width (including coxæ), .405 mm.; pterothorax: width, .465 mm.; abdomen: width, .510 mm.; tube: length, .248 mm.; width at base, .096 mm.; width at apex, .048 mm. Antennal segments: 1, 39μ; 2, 60μ; 3, 87μ; 4, 78μ; 5, 75μ; 6, 68μ; 7, 63μ; 8, 41μ; total, .511 mm.; width at segment 4, .041 mm.

Described from one female, taken in sweepings from grass and weeds at Monterey, Mexico, July 5, 1908, by Mr. Charles A. Hart.

The large size, short head, long spines, and the peculiar antennal coloration at once distinguish this species from its allies.

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SIX NEW EAST INDIAN CRINOIDS BELONGING TO THE FAMILY CHARITOMETRIDÆ.

BY AUSTIN H. CLARK.

In an earlier paper in this volume (pp. 17–28) I described seventeen new crinoids belonging to the families Comasteridæ and Zygometridæ which had been discovered in the East Indies by the Dutch steamship *Siboga*. The present paper deals with the new species of Charitometridæ in the same collection.

Preliminary descriptions of the new forms in the remaining families will be found in the current volumes of the "Notes from the Leyden Museum," the "Zoologischer Anzeiger," and the "Annals and Magazine of Natural History."

FAMILY CHARITOMETRIDÆ.

Pachylometra crassa sp. nov.

This form is nearest to *P. flexilis*, but it possesses stouter cirri which have rather prominent dorsal processes distally, and the arm bases are much smoother, the axillaries and corresponding ossicles being without the characteristic median tubercles and rounded posterior processes.

The centrodorsal is very large, truncated conical, the sides making a rather small angle with each other, 9 mm. in diameter at the base, 5 mm. across the irregularly convex dorsal pole, and 5 mm. high; the cirrus sockets are arranged in ten columns, usually three to a column, the columns being closely crowded interradially, slightly separated radially.

The cirri are about xxv, 18–22 (usually 20), 32 mm. long, stout and short segmented: the first segment is short, and the following gradually increase in length so that the sixth and following are nearly as long as broad, those in the outer third of the cirri being slightly shorter again; on the seventh a slight broad subterminal dorsal hump makes its appearance which slowly increases in height so that the terminal nine possess a prominent broad blunt and well rounded subterminal tubercle which becomes more pointed on the last two or three before the penultimate; the opposing spine is small, subterminal, resembling the tubercle on the preceding segment, but arising from a much smaller base.

The radials and the ends of the basal rays are concealed; the I Br₁ are very short, broadly V-shaped, sometimes concealed in the median line so that only the lateral portions are visible; the dorsal surface is more or less irregular; the axillaries are short and broad, nearly three times as broad as long, rhombic, the lateral angles truncated so that the lateral sides are nearly or quite as long as those of the I Br₁.

The arms are ten or eleven in number, about 180 mm. long; the first two brachials are about equal in size, slightly wedge-shaped (more pronouncedly so on the second), about three times as broad as the median length; the synarthrial tubercles are scarcely marked; the brachials have slightly produced distal edges and a more or less swollen dorsal surface.

Type locality.—"Siboga" Station No. 259.

Pachylometra hellus sp. nov.

This new form is nearest *P. septentrionalis* of Japan, but it is of more delicate build with much more slender cirri and with the dorsal surface of the division series and arm bases strongly convex and perfectly smooth without any trace of median carination or of tubercles.

The centrodorsal is of moderate size, flattened hemispherical or thick truncated conical, 6 mm. in diameter at the base, 3 mm. across the flat dorsal pole and 4 mm. high; the cirrus sockets are arranged in ten equally separated columns of two or three each.

The cirri are about xxv, 23, about 28 mm. long; the first segment is short, the following gradually increasing in length to the fifth and sixth which are the longest, between one third and one half again as long as broad; the following segments very slowly decrease in length so that those in the distal third of the cirri are about as long as the distal diameter; in the distal third of the cirri the median portion of the distal dorsal edge of the segments is somewhat swollen, this on the last five or six before the penultimate becoming a blunt subterminal dorsal tubercle; the opposing spine is prominent, short, sharp, terminal, directed obliquely forward.

The ends of the basal rays are visible as large rhombic tubercles in the angles of the calyx; the radials are entirely concealed; the I Br₁ are very short, broadly V-shaped with the proximal and distal edges parallel; the lateral thirds of the proximal and distal edges are slightly produced; the axillaries are very short, nearly or quite three times as broad as long, rhombic in shape with concave sides and truncated lateral angles, the lateral edges being as long as those of the I Br₁; the lateral edges and all but the median portion of the proximal edge are very slightly produced; the synarthrial tubercles are low and broad, scarcely evident.

The basal contour of the animal is broadly rounded, exactly like that of *P. septentrionalis*.

The twenty-six arms of the type are 125 mm. long; there are seven II Br 4 (3 + 4) and three II Br 2 series; the III Br series are 2, internally developed except for one which is external by the side of an internal III Br series.

Type locality.—"Siboga" Station No. 254.

Pachylometra fragilis sp. nov.

The centrodorsal is low, flattened hemispherical, 7 mm. in basal diameter and 3 mm. high; the cirrus sockets are closely crowded, in two or three irregular rows and approximately fifteen columns, three in each radial area; the cirrus sockets touch the proximal border of the centrodorsal.

The cirri are about XXX, 17–18, 30 mm. to 35 mm. long, moderately slender; the first four segments are short, the fifth is half again as long as broad; the sixth–eighth are the longest, twice as long as broad; the following slowly decrease in length becoming about as long as broad distally and then increase again so that the penultimate and antepenultimate are about twice as long as broad; the earlier longer segments have slightly prominent ends, and the shorter distal segments have the distal dorsal margin slightly swollen.

The subradial clefts are deep, but very narrow; the ends of the basal rays are visible as large and prominent rhombic areas in the angles of the calyx; the radials are very short, strongly curved, with a low broad obscure median tubercle; the I Br_1 are extremely short, band-like, with an obscure low median tubercle; they are produced inward toward the center of the calyx so that their sharply flattened lateral edges almost meet, being separated only by a narrowly V-shaped cleft running to the edge of the inner edge of the synarthrial joint face; though the dorsal surface of the segment is well rounded the distance from the central canal to the median part of the dorsal edge is not so great as the distance from the central canal to the inner angle; counting the entire median length of the joint face the broadest portion is found to be scarcely more than one third of the distance from the dorsal edge to the inner angle; the ossicle is sharply "wall-sided" from its widest point inward; the axillaries are low, rhombic, with the lateral angles truncated so that the lateral edges are about as long as the lateral edges of the I Br_1, twice as broad as long; there is an obscure well rounded median carination; the distal angle is produced, but broad; the dorsal surface is rather strongly convex; the lower portions of the axillaries are strongly produced inward so that, like the I Br_1, the inner sides are reduced almost to apices which almost meet the similar inner ends of the other axillaries; from this central point the inner face of the axillaries slopes away almost horizontally so that the inner faces of the axillaries, together with the division series, form the platform upon which the visceral mass rests; the sides of the inner half of the axillaries are sharply "wall-sided"; the II Br series are similar to the I Br series, but rapidly decrease in dorsoventral width; they are sharply flattened laterally for somewhat more than their inner half; the first two brachials are flattened laterally for their entire inner side and the third and fourth are flattened on the inner portion of the inner side.

P_1 is 9 mm. or 10 mm. long, slender and evenly tapering, with from twenty-six to thirty-one segments all of which are much broader than long; P_2 is similar, very slightly stouter, of the same length or very slightly longer, with twenty-five segments of which the outermost are about as long as broad; P_3 is 11 mm. long with twenty-two segments, resembling P_2, but with the segments in the distal half about as long as broad; P_4 is 11 mm. long with twenty segments which become about as long as broad on the fifth or sixth and slightly longer than broad terminally; P_5 is 9 mm. long with fifteen segments, most of which are about as long as broad; P_8 is 8 mm. long with fourteen segments; P_9 is 7 mm. long with thirteen segments; in the genital pinnules the third–seventh segments are just perceptibly broader than those following; the distal pinnules are very slender, 10 mm. long with twenty segments.

Type locality.—"Siboga" Station No. 166.

Glyptometra timorensis sp. nov.

This new species is nearest to *G. lata* of southern Japan, but the cirri are shorter and slightly stouter, with shorter segments, and the ornamentation of the ossicles of the I Br series and of the proximal brachials is much more smooth and regular; there is none of the coarsely tubercular rugosity characteristic of *G. lata*.

The centrodorsal is very thick discoidal, the sides sloping slightly inward, 6.5 mm. in diameter at the base and 3 mm. high; the cirrus sockets are arranged in ten columns of two each, the columns being closely crowded against each other and showing no differentiation into pairs.

The cirri are XX, 17–20, 20 mm. to 25 mm. long, stout; the first segment is very short, the following gradually increasing in length to about the seventh, which, with the following, is about twice as broad as the median length, or, in the longest cirri, half again as broad as the median length; the dorsal profile of the segments beyond the seventh or eighth is convex, becoming gradually more strongly so toward the end of the cirri.

The ends of the basal rays are visible as flat triangular or irregular areas in the angles of the calyx; the radials are entirely concealed or are slightly visible as small irregular tubercles or flat irregular areas in the angles of the calyx; the I Br_1 are short, broadly chevron-shaped, the proximal and distal borders parallel, about four times as broad as long; the proximal edge is produced into a thin border overlapping and concealing the proximal portion of the centrodorsal, though flush with its general surface; the border of this produced proximal edge is usually irregularly scalloped or bears a few low coarse teeth, though it may be nearly plain; it sometimes bears a few low tubercles; it may be evenly curved, becoming horizontal just over the ends of the basal rays, or it may be regularly curved in its lateral thirds but nearly straight in its median third; the middle of the dorsal surface of the I Br_1 is occupied by a large prominent broadly oval well rounded tubercle; the axillaries are broadly rhombic with the lateral angles truncated so that the lateral edges are from one half to two thirds the length of the sides of the I Br_1, two and one half times as broad as long, in the median line nearly twice as long as the I Br$_1$; the center, except at the anterior angle, is occupied by a tubercle which is more elongated dorsoventrally than that on the I Br$_1$ and, though as high, less prominent as it rises much less abruptly; the lateral edges of the I Br$_1$ and I Br$_2$ are turned outward, but not nearly so strongly as is the case in *G. lateralis;* the lateral thirds of the proximal edge of the axillaries and the corresponding portions of the distal edge of I Br$_1$ are also turned upward to the same height as the lateral edges; the eversion of the latter is most marked just over the ends of the basal rays and gradually decreases anteriorly to the distal corner of the lateral edge of the axillary; it is continued thence along the sides of the first four brachials; the inner lateral edges of the first five brachials are similarly modified.

The ten arms are, in the type, 165 mm. long.

Type locality.—"Siboga" Station No. 297.

Strotometra priamus sp. nov.

The centrodorsal is very low hemispherical, almost discoidal, 1.5 mm. to 2 mm. in diameter; the cirrus sockets are arranged in one and a partial second marginal row, alternating and closely crowded.

The cirri are XVII, 11–12, 8 mm. to 11 mm. long, slender, with elongated segments; the first segment is very short, dorsally expanded into a rounded knob-like process; the second is not quite so long as broad; the third is twice as long as the median diameter; the remainder are very slightly shorter, becoming a trifle longer again, about two and one half times as long as broad, on the antepenultimate and penultimate; the penultimate is less in lateral diameter than the preceding; the third and following are moderately constricted centrally with prominent distal ends, this feature gradually decreasing distally; there are no dorsal processes; the opposing spine is prominent, terminal, directed obliquely forward, the proximal profile convex and the distal concave; the base occupies only slightly more than one third of the dorsal surface of the penultimate segment.

The ends of the basal rays are visible as small but prominent tubercles in the angles of the calyx; the radials are concealed by the centrodorsal; the I Br$_1$ are short, about four times as broad as long in the median line; the proximal border is slightly convex, usually becoming straight in the lateral quarters; the lateral edges of each I Br$_1$ make a considerable angle with each other, but are in close apposition with those of the adjacent I Br$_1$; they are turned outward and produced as in *Glyptometra lateralis;* the distal edge is sometimes obscurely scalloped in the lateral thirds, and is slightly concave centrally for the receipt of a rounded posterior process from the axillary; the axillaries are exceedingly short, about two and one half times as broad as long: their lateral edges form a continuous line with those of the I Br$_1$ and are about half as long as the latter; they are similarly turned outward and produced, this feature continuing inward along the proximal border about as far as the median third; the distal edges are slightly everted.

The ten arms are 40 mm. long; the first brachial has the proximal and distal edges parallel; it is in close apposition with its neighbors both internally and externally; the proximal edge is slightly everted; the outer edge is turned outward and produced, like the outer edges of the preceding ossicles; the inner edge is similarly, though less, turned outward and produced; the synarthrial tubercles are small and well rounded, but rather prominent; the second brachial is similar to the first, but about twice as long exteriorly as interiorly; the third and fourth (the first syzygial pair) are together roughly oblong, about two and one half times as broad as long, their lateral edges being modified as in the two preceding; the following three brachials are wedge-shaped, about twice as broad as the maximum length, with the dorsal surface convex and the distal edge therefore prominent; after the tenth the brachials become triangular, about as long as broad, later very obliquely wedge-shaped and toward the end of the arms twice as long as broad.

P_1 is 6 mm. long with thirty-five segments, very slender and delicate, resembling, except for the absence of the enlargement of the first two segments, P_1 in *Calometra;* the earlier segments are broader than long, the seventh or eighth and following about as long as broad; P_2 is 6 mm. long with eighteen segments of which the sixth–eleventh are greatly produced ventrally forming a roof over the gonads, which are also protected by a heavy ventral plating; the terminal seven segments are very small and delicate; P_3 is similar, 4.5 mm. long with fourteen segments, of which the sixth–tenth are greatly expanded; P_4 is 4 mm. long with thirteen segments, the fifth–ninth expanded; P_5 is 3 mm. long with ten segments, none of which are expanded; the distal pinnules are 5 mm. long with eleven or twelve segments.

Type locality.—"Siboga" Station No. 266.

Strotometra ornatissimus sp. nov.

The centrodorsal is flattened hemispherical 2.5 mm. in proximal diameter, with the dorsal pole slightly convex; the cirrus sockets are arranged in one and a partial second closely crowded and irregular marginal row.

The cirri are about xv (there are twenty-two cirrus sockets, but some of them are not of full size); the longest stump is 4.5 mm. to the distal dorsal edge of the fifth segment; the first segment is about twice as broad as long, the second about as long as the median diameter, centrally constricted, the third about twice as long as the median diameter centrally constricted with the distal end especially prominent as in the second, the fourth about three times as long as the median diameter, similar to the third, the fifth similar to the fourth but not quite so much constricted centrally and hence appearing slightly broader in lateral view.

The radials are just visible beyond the edge of the centrodorsal; the I Br_1 are short, about four times as broad as the median length, the proximal border produced into a thin straight margin, the lateral borders slightly more produced and turned outward; the axillaries form a broad inverted "V"; the lateral edges, which are half again as long as those of the I Br1 are, like them, turned outward and are straight or bear two or three broad scallops; the lateral thirds of the proximal border are produced and extended downward over the distal border of the I Br1 with a scalloped or tubercular edge which is nearly parallel to the corresponding distal face; the distal sides of the axillaries are plain and unmodified.

The ten arms are about 40 mm. long; the first brachial has the proximal and distal edges parallel, the outer edge slightly produced and faintly scalloped, the inner edges in apposition, in their distal half everted and scalloped; a similar distance of the inner portion of the distal edge is similarly everted and scalloped, and the internal distal angle is rounded, so that the inner distal angle is produced into a rounded thin scalloped process; the proximal and distal borders, other than above described, are unmodified; the second brachial is about as large as the first, slightly wedge-shaped; the distal edge is everted and stands out at right angles to the dorsoventral axis of the arm as an enormous thin rounded or fan-shaped crest with a rounded or broadly scalloped edge, sometimes divided in the middle, which may reach 1.5 mm. in height, or three or four times the greater (outer) length of the ossicle; the proximal outer corner of the ossicle is slightly produced over the distal outer corner of the first brachial, and is scalloped or slightly tuberculated; the produced inner distal angles of the first brachials reach as far as the base of the distal crest on the second; the third brachial (the hypozygal of the first syzygial pair) is oblong, unmodified, very short, five or six times as broad as long; the fourth brachial (the epizygal of the first syzygial pair) is very short, oblong, little if any larger than the preceding brachial, but with the distal border everted and produced into an enormous crest similar to, and nearly or quite as large as, that on the second brachial; the fifth brachial is slightly wedge-shaped with a crest about half as high as that on the preceding brachial and more irregular; the sixth brachial has a strongly produced and thickened distal edge which is coarsely scalloped; the seventh brachial is slightly wedge-shaped, two to two and one half times as broad as long, unmodified, with the distal edge slightly produced and finely spinous; after the tenth or twelfth the brachials become triangular, about as long as broad, and after four or five more very obliquely wedge-shaped and longer than broad, less obliquely wedge-shaped and longer distally; the brachials beyond the sixth are almost smooth, with only slightly produced and finely spinous distal ends.

Type locality.—"Siboga" Station No. 122.

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PROCEEDINGS

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A NEW PUMA FROM LOWER CALIFORNIA.

BY J. C. PHILLIPS.

In January, 1912, I received from Mr. E. W. Funcke the skin and skull of an adult male puma from Lower California. The locality is Calmalli, a small place at about latitude 28° 40′.

The small size and round shape of this skull immediately struck the eye, and more careful comparison shows the form it represents to be deserving of specific rank.

The puma is probably a rare animal throughout the entire length of the peninsula, but I am informed by Mr. W. W. Brown, Jr., that it occurs even south to the vicinity of Cape St. Lucas. The form being undescribed, I name it:

Felis improcera sp. nov.

Type, adult male, skin and skull, M. C. Z. No. 12,704, from Calmalli, Lower California; collected September, 1911, by E. W. Funcke.

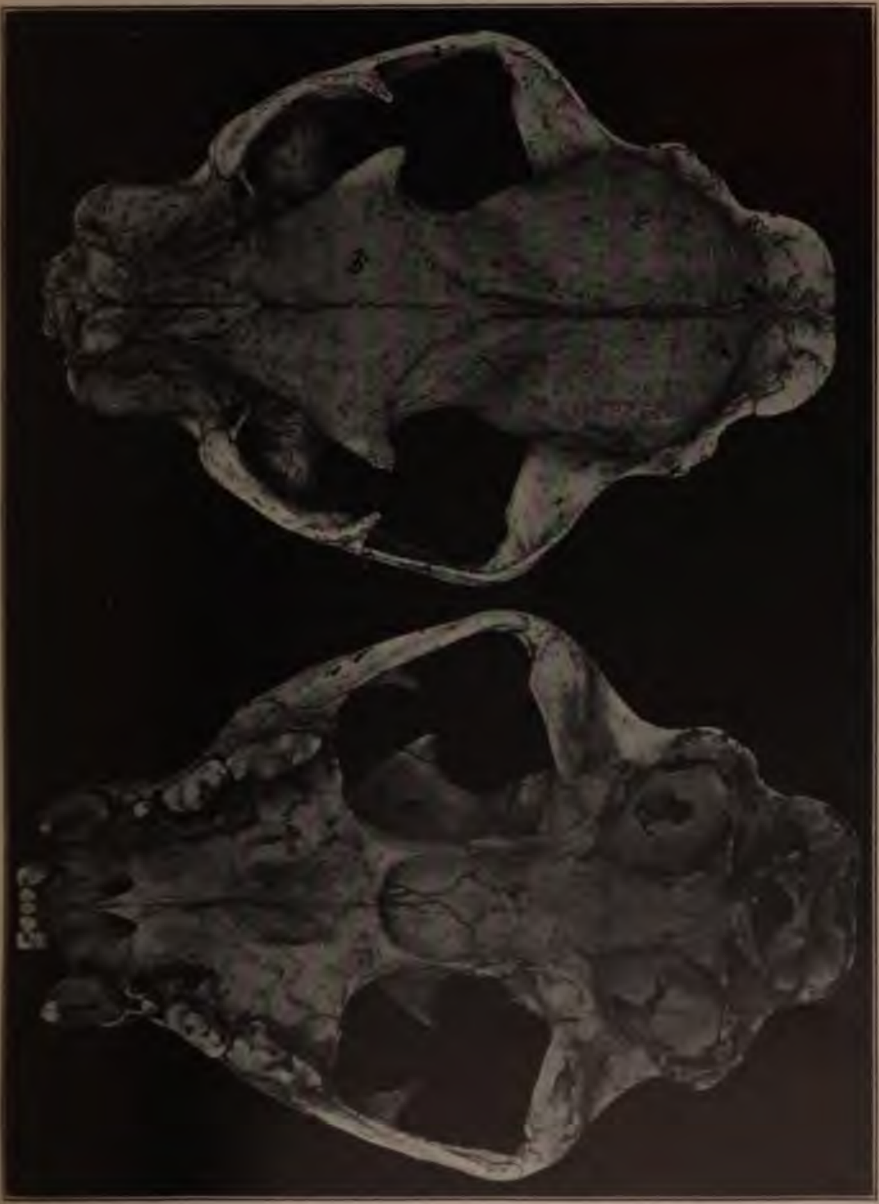
General characters.—Size small, much smaller than *F. browni* Merriam, of the Colorado bottom, with teeth relatively and actually larger.

Color.—Dark fawn color (Ridgway), darker along the back where it is mixed with dusky tipped hairs. General color less reddish than in *F. azteca.* Tail bicolored, ending in a conspicuous black tip, the hairs of which are three centimeters long.

Cranial characters.—Skull very small. General shape rounder and less elongate than in either *F. browni* or *F. azteca.* Nasals shorter and narrower, audital bullæ very large and much inflated, anterior nares small and round and upper part of ascending branch of premaxilla facing more forward than in other forms. Inferior lateral prolongation of nasals thin and short, and entirely internal to maxillary process.

Cranial measurements.—Basal length, 150 millimeters; palatal length, 72; palatal length from gnathon to tip of hamalar process, 105; length of nasals, 55; zygomatic width, 124; least width of nasals (middle part), 14; width of anterior nares, 27; length of anterior nares, 31; length of lower tooth row from back of first molar to front of canine, 69; length of upper tooth row, 60; length of ramus of lower jaw, from condyle to base of incisor 1, 125; width between postorbital processes of parietals, 68; greatest width of palate outside tooth row, 76.

Measurements in the flesh were not taken.



Felis improcera Type. Reduced.

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DESCRIPTIONS OF SOME NEW SPECIES AND SUBSPECIES OF BIRDS FROM TROPICAL AMERICA.

BY ROBERT RIDGWAY,
Curator, Division of Birds, U. S. National Museum.

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The following new species and subspecies have been noted during the preparation of Part VI of "Birds of North and Middle America." As the completion of this volume is still some months distant, it is thought desirable to publish the new forms without delay.

Capito aurantiiventris sp. nov.

Type from an unknown locality in the Upper Amazon Valley.* No. 7601, coll. Mus. Comp. Zool. Collected by Newton Dexter.

Agreeing with *C. peruvianus* (?) from eastern Ecuador, etc., in orange-red throat (unspotted in both sexes), but differing in having the forehead wax yellow instead of reddish orange, rump streaked with golden yellow or orange instead of sulphur yellow, and the abdomen and flanks crossed by a broad band of orange-yellow or yellowish orange instead of being pale sulphur yellow, passing into white posteriorly.

Measurements of type.—Wing, 83; tail, 50.5; culmen (from base), 22.5; tarsus, 22; outer anterior toe, 19.5.

Capito auratus bolivianus subsp. nov.

Type from Rio Beni, Bolivia. No. 47,379, Mus. Comp. Zoology; adult male. (Native skin.)

Differing from *C. a. auratus* of eastern Peru and Ecuador to Colombia,

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* According to information received from Mr. Bangs, the specimens collected by Newton Dexter, while accompanying the Thayer Expedition, were mostly made on the Rio Negro and Rio Tapajós, and Mr. Bangs thinks the bird designated above came from somewhere along the latter. Unfortunately, through some one's carelessness, the original labels of the specimens of birds in the collection were all removed, so there is now no record of the localities or other data.

Venezuela, and the Guianas, in deep russet, instead of olive-yellowish, pileum and darker color of tail and remiges.

Measurements of type.—Wing (outer primaries wanting); tail, 35; culmen (from base), 24.5; tarsus (feet wanting).

Aulacorhynchus prasinus virescens subsp. nov.

Type from Chasniguas, Honduras. No. 120,263, U. S. Nat. Mus., adult female. Collected by E. Wittkügel, Jan. 2, 1891.

Differing from *A. p. prasinus*, of southeastern Mexico, in smaller size (except bill and feet), relatively much shorter tail, deeper chestnut of under tail-coverts, and more yellowish green of under parts (the chest never tinged with blue), and white of throat of a yellowish hue, especially next to the green of lower foreneck.

Measurements of type.—Wing, 119; tail, 104.5; culmen, 58; tarsus, 34; outer anterior toe, 26.

The average measurements of four adult males of the same form from northern Nicaragua, compared with those of six adult males of *A. p. prasinus* from Vera Cruz and five from Chiapas and Guatemala, are as follows:

Four adult males from Nicaragua: Wing, 122.1; tail, 108; culmen, 74.7; tarsus, 34.4.

Five adult males from Chiapas and Guatemala: Wing, 132.5; tail, 122.2; culmen, 74.6; tarsus, 33.9.

Six adult males from Vera Cruz: Wing, 129.2; tail, 113.4; culmen, 73.1; tarsus, 34.1.

Pteroglossus torquatus erythrozonus subsp. nov.

Type from Temax, Yucatan. No. 106,310, U. S. National Museum; adult; collected by Geo. F. Gaumer.

Similar to *P. t. torquatus*, but much smaller, and color of thighs and under tail-coverts paler (dull cinnamon-rufous instead of chestnut).

Measurements of type.—Wing, 140; tail, 136.5; culmen, 89.5; tarsus, 32; outer anterior toe, 27.5.

Monasa rikeri sp. nov.

Type from Diamantina, lower Amazon, Brazil, June 30, 1887. No. 121,033, U. S. National Museum, adult male. Collected by C. B. Riker.

Agreeing with *M. grandior* Sclater and Salvin, of Costa Rica and Nicaragua, in black malar apex combined with white or light rusty chin and forehead, but decidedly smaller, with the lower throat, crown, and occiput slate color or deep slate-gray instead of black; and white (or pale rusty) capistrum rather more restricted. Differing from *M. peruana* Sclater, of the Upper Amazon Valley, in the black (instead of white) malar apex.

Measurements of type.—Wing, 121.5; tail, 115.5; exposed culmen, 32; tarsus, 20.5; outer exterior toe, 17.5.

This form has hitherto been referred to *M. morphœus* (Hahn and Küster), of eastern Brazil, but is decidedly smaller and differs further in the black instead of white malar apex. Six specimens (from Diamantina, Santarem, and Itaituba) agree in the characters mentioned.

Monasa sclateri sp. nov.

Type from central Colombia ("Bogota" trade skin). No. 64,076, adult, U. S. National Museum.

Similar in restriction of white (or pale rusty) on head to forehead and lores (the chin and malar apex being black) to *M. pallescens* Cassin, of extreme northwestern Colombia, but conspicuously different in much darker coloration of the wing-coverts, which are deep slate-gray instead of pale hoary gray, becoming nearly white on anterior portion of lesser covert area and under side of wing.

Measurements of type.—Wing, 140; tail, 134; exposed culmen, 35; tarsus, 20; outer anterior toe, 19.

This is the "*Monasa pallescens*" of Sclater and various authors, but not of Cassin. True *M. pallescens* seems to be unknown in collections except for the type and co-types, from the Rio Truando, in the collections of the Academy of Natural Sciences, Philadelphia, and the U. S. National Museum. Seven specimens of *M. sclateri* examined, from "Bogota," and near Honda, Tolima.

Momotus lessonii exiguus subsp. nov.

Type from Temax, Yucatan. No. 106,311, coll. U. S. Nat. Mus. Adult male. January, 1885. Collected by F. Gaumer.

Similar to *M. l. lessonii*, but general color rather lighter and decidedly greener, the hindneck always green (concolor with back, etc.), and under parts with tawny wash (if present) confined to chest; bill averaging decidedly smaller.

Measurements of type.—Wing, 130; tail, 210; bill from nostril, 26.5; tarsus, 28.5; middle toe, 19.

Electron * **carinatus viridis** subsp. nov.

Type from La Vijagua, northern Costa Rica. No. 21,067, coll. E. A. and O. Bangs. Adult male. March 3, 1908. Collected by C. F. Underwood.

Similar to *E. c. carinatus*, but general color of under parts dull green, tinged on foreneck, chest, and breast with olive-green, but without the tawny oil green suffusion always present and often conspicuous in *E. c. carinatus*, the posterior under parts light bluish green; upper parts purer (less yellowish) green; bill relatively broader and more strongly arched.

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* *Electron* Gistel, Naturg. des Thierreichs für höhere Schulen, 1848, p. viii. (New name for *Crypticus* " Bonaparte " i. e. Swainson, preoccupied.)

As this name antedates *Prionornis* Salvin and Godman (Biol. Centr.-Am., Aves, II, sig. 59,* July, 1885, 467), I do not see how we can avoid its use as the correct name for this genus.

Measurements of type.—Wing, 116; tail, 180; exposed culmen, 37; tarsus, 17; middle toe, 14.

Eumomota superciliaris bipartitus subsp. nov.

Type from Cacoprieto, Oaxaca. No. 145,282, coll. U. S. Nat. Mus. Adult male. February, 1880. Collected by Prof. A. Sumichrast.

Similar to *E. s. superciliaris*, from Yucatan, Campeche, and eastern Tabasco, but with under parts of body divided into two very sharply defined differently colored areas, the breast uniform olive-greenish, the remaining portion uniform cinnamon-rufous; cinnamon-rufous interscapular area usually either much larger or better defined.

Measurements of type.—Wing, 114.5; tail, 219; exposed culmen, 41; tarsus, 22; middle toe, 17.5.

Antrostomus nelsoni sp. nov.

Type from Chichen-Itza, Yucatan. No. 40,093, coll. Mus. Comp. Zool. Adult male. March 29, 1904. Collected by L. J. Cole.

Resembling *A. salvini* Hartert in size and general coloration, but differing conspicuously in the much greater extent and different pattern of the white terminal areas to lateral rectrices, which extend farther from the tip on inner webs than on the outer; in the broad and conspicuous unbroken collar of tawny-ochraceous across hindneck, and immaculate, instead of barred, under tail-coverts.

Measurements of type.—Wing, 177; tail, 128; exposed culmen, 13.5; tarsus, 17.5; middle toe, 17.

This is the bird which Mr. Nelson, in describing his *A. notabilis* (from Tamaulipas), considered to be the *A. salvini* of Hartert; but since the latter was based exclusively and explicitly on the *A. macromystax* (not *Caprimulgus macromystax* Wagler) of Baird, Brewer, and Ridgway, which is the same as *A. notabilis*, it is very obvious that Mr. Nelson made an error in the case, the exceeding poor colored figure in the "Biologia Centrali-Americana" having misled him.

It is barely possible that *A. nelsoni* may prove to be the male of *A. badius* Bangs from British Honduras, but the general coloration of the latter is very much more rufescent and the two are just as likely to prove quite distinct. Unfortunately the type and only known specimen of *A. badius* is a female (though erroneously determined as male), so that we are as yet ignorant as to the color-pattern of the tail in the male of that form.

Nyctidromus albicollis nelsoni subsp. nov.

Type from city of Colima, Colima, southwestern Mexico. No. 154,746, coll. U. S. Nat. Mus. (Biological Survey coll.). Adult male; March 26, 1892; collected by E. W. Nelson.

Decidedly larger and paler than *N. a. albicollis*, the tawny phase averaging lighter and brighter in color, with buff margins to scapulars broader; gray phase similar in coloration to *N. a. merrilli* but much smaller.

Measurements of type.—Wing, 162; tail, 155; exposed culmen, 12; tarsus, 25; middle toe, 20,5.

Nyctidromus albicollis sumichrasti subsp. nov.

Type from Teapa, Tabasco, southeastern Mexico. No. 166,060, coll. U. S. Nat. Mus. (Biol. Surv. coll.). Adult male. March 10, 1900. Collected by Nelson and Goldman.

Similar in coloration to *N. a. albicollis*, but much larger; similar in size to ***N. a. nelsoni*** and *N. a. yucatanensis*, but much darker.

Measurements of type.—Wing, 172.5; tail, 169.5; exposed culmen, 13; tarsus, 25; middle toe, 20.5.

The recognizable forms of this species occurring from Panama northward are as follows:

1. *Nyctidromus albicollis albicollis* (Gmelin).—Panama to State of Chiapas, southern Mexico.
2. *Nyctidromus albicollis yucatanensis* Nelson.—Yucatan, Campeche, and extreme eastern Tabasco; British Honduras (in fall and winter).
3. *Nyctidromus albicollis sumichrasti* Ridgway.—Tabasco to Vera Cruz, eastern Mexico.
4. *Nyctidromus albicollis nelsoni* Ridgway.—Southwestern Mexico, from Oaxaca to Sinaloa.
5. *Nyctidromus albicollis insularis* Nelson.—Tres Marias Islands.
6. *Nyctidromus albicollis merrilli* Sennett.—Northeastern Mexico, in State of Tamaulipas and southern Texas; in winter south to Mirador, Vera Cruz and Metlaltoyuca, Puebla.

Nyctibius griseus costaricensis subsp. nov.

Type from Sarchí, Alajuela, Costa Rica. No. 85,550, coll. U. S. Nat. Mus. Adult female. August 6, 1881; José C. Zeledón, collector.

Agreeing in size with *N. g. jamaicensis*, but coloration darker; decidedly smaller and darker than *N. g. mexicanus*; averaging decidedly larger than *N. g. panamensis* and coloration lighter.

Measurements of type.—Wing, 290; tail, 202; exposed culmen, 20; tarsus, 11.5; middle toe, 19.5.

Nyctibius griseus panamensis subsp. nov.

Type from Natá, Coclé, Panamá. No. 154,252, coll. U. S. Nat. Mus. Adult male. Jan. 24, 1889. Collected by Heyde and Lux.

Similar in coloration to *N. g. griseus*, but decidedly larger; averaging decidedly smaller than *N. g. costaricensis* and coloration darker.

Measurements of type.—Wing, 270; tail, 198; exposed culmen, 20; tarsus, 12; middle toe, 20.

Nyctibius maculosus sp. nov.

Type from Ambato, Ecuador. No. 35,571, coll. Am. Mus. Nat. Hist.; M. A. Vascomez, collector.

Similar in size to *N. griseus jamaicensis*, but coloration very different; general tone of coloration much darker, the under wing-coverts and inner webs of primaries uniform sooty blackish, posterior under parts spotted with black, and a large white or whitish area on middle wing-coverts.

Measurements of type.—Length (skin), 340 mm.; wing, 265; tail, 185; exposed culmen, 21.5; tarsus, 10.5; middle toe, 19.

A specimen from Bogotá, Colombia (no. 4384, coll. Am. Mus. N. H.), is evidently the same species, but may represent a different subspecies. It differs in having the middle wing-covert area nearly pure white, and the posterior under parts apparently white and with less heavy markings; much of the plumage of the under parts is wanting, however. It measures: Wing, 265; tail, 187; exposed culmen, 23; tarsus, 9.5; middle toe, 19.5.

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GENERAL NOTES.

THE TRINIDAD OPOSSUM ON MARTINIQUE.*

The large Trinidad opossum (*Didelphis marsupialis insularis*) has been recorded by various authors from the West Indian islands Dominica, Grenada, and St. Vincent, but there appears to be no published account of the species on Martinique. In the collection of the United States National Museum are three specimens of this opossum with records as follows: Nos. 5860 and 5861, ♀ and juv., "Martinique, Com. Perry," catalogued in 1862; and No. 13,038, ♀, "Martinique, W. I., August, 1878, F. A. Ober."
—*N. Hollister.*

THE MONA MONKEY ON THE ISLAND OF ST. KITTS.*

There is, apparently, no published record of the Mona Monkey on the island of St. Kitts, West Indies. In Dr. Glover M. Allen's recently published "Mammals of the West Indies," the Green Guenon is recorded from this island, as well as from Barbados, and the Mona is recorded from Grenada. In the United States National Museum collection, in addition to specimens of the Green Guenon, is a skin of the Mona (*Lasiopyga mona*) collected on St. Kitts in 1880 by Mr. Fred A. Ober.
—*N. Hollister.*

TWO GENERA OF BATS NEW TO MIDDLE AMERICA.

In the recent collections of mammals made by E. A. Goldman in connection with the Smithsonian Biological Survey of the Canal Zone, are species of two South American genera of bats not heretofore known from Middle or North America. One is *Dirias minor* (Osgood) recently described from Encontrados, Zulia, Venezuela, and represented in Goldman's collection by a single male specimen from Empire, Canal Zone, where it was captured February 16, 1912. The other is *Macrophyllum macrophyllum* (Wied) described from Brazil and of which two specimens were collected in the ruins of the old city of Panama February 7, 1912. I am indebted to Mr. Gerrit S. Miller, Jr., for calling my attention to these additions to the Panama fauna, early publication of which is desirable in connection with other work now in progress.
—*E. W. Nelson.*

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THE GENERIC NAMES CERCOMYS AND PROECHIMYS.

In a paper published in 1899 Dr. J. A. Allen* reviewed the generic names *Echimys* and *Loncheres*, and after showing that the name *Echimys* is inapplicable to the group containing *Echimys cayennensis* and other species he proposed *Proechimys*, instead, with *Echimys trinitatis* as type. He seems, however, to have overlooked the genus *Cercomys* F. Cuvier,† which dates from 1829. The original description of *Cercomys* is accompanied by a plate illustration of an animal of the type currently recognized as *Proechimys;* but more reliable evidence of the identity of these genera is afforded in the illustrations of cranial characters published by Cuvier‡ in contrasting *Cercomys* with other genera in 1832. The skull figured is that of a young individual with the 3d upper molar not yet in place. In the lateral view the angular process is missing, doubtless having been broken off, and the imperfect nasals are indicated by a dotted line. The molariform teeth are well shown, and the resemblance to *Proechimys trinitatus* at the same stage of development is very striking.

The similarity of *Cercomys* and a spiny rat of this group in cranial characters was noted by Gunther,§ who in describing *Echimys brevicauda*, says: "The *skull* and *dentition* appear to differ scarcely from those of *Cercomys cunicularius* and *Echimys cayennensis.*" Careful comparison of museum material with the descriptions and illustrations of F. Cuvier convinces me that *Cercomys cunicularius* and *Proechimys trinitatis* are congeneric, and that *Cercomys* should replace *Proechimys* as the generic name at least for the species having three enamel islands in the crowns of the first and second upper molars. In many forms this number of enamel islands is normally present in these teeth and has apparently become a fixed character while the number in the other molariform teeth is somewhat variable. —*E. A. Goldman.*

FOSSIL CROCODILES FROM THE CANAL ZONE.

The section of Vertebrate Paleontology of the U. S. National Museum has recently received from Mr. D. F. MacDonald, geologist for the Panama Canal Commission, two fossil crocodilians found in the canal excavations. Although fragmentary they are of interest as being the first fossil reptilian remains reported from this region. One specimen is from the Culebra formation, opposite Culebra, the other from the Gatun formation, Gatun Locks. Both represent crocodiles of robust proportions. —*C. W. Gilmore.*

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* Bull. Amer. Mus. Nat. Hist., XII, pp. 257-264.

† Hist. Nat. Mamm., VI, livr. LX, pl. (Cercomys du Brésil) with 2 pp. text, Sept. 1829.

‡ Nouv. Ann. Mus. Hist. Nat., Paris, I, 1832, pp. 449-452, pls. 18 fig. 1, 19 figs. 1-2.

§ Proc. Zool. Soc. Lond., 1876, p. 749.

THE NAMES OF TWO NORTH AMERICAN WOLVES.

The technical names now in use for two of the wolves occurring in eastern North America are clearly untenable.

In 1761[*] Buffon published an account of a melanistic wolf brought alive to Paris from Canada by a French naval officer. The plate representing this animal was copied by Schreber fifteen years later with the addition of the name *Canis lycaon*.[†] Although the name *lycaon* has been recently applied to the wolf of the Pyrenees,[‡] it must stand for the animal occurring in eastern Canada and the northeastern United States. This form, as pointed out by Baird,[§] differs from western and northern wolves in the weakness of the rostral portion of the skull.

In 1829 Richardson described the melanistic phase of the wolf of Mackenzie and Saskatchewan as [*Canis lupus, occidentalis*] var. E. *Lupus ater*. He supposed that the same animal occurred throughout North America, and at the end of his account he mentioned that: "it is reported to be plentiful in Florida, where, according to Bartram, the females are distinguished by a white spot on the breast."[||] On the strength of this final statement Bangs restricted the name *ater* to the wolf of Florida.[¶] This course is obviously not in harmony with the spirit of the International Code, Art. 30. There can be little if any doubt that a specific name like a generic name must, under the code, be applied to an animal known at first hand by the original author, when, as in the present case, there is choice between such an animal and others known from literature only. The Florida wolf is thus left without a technical name, since the *Canis lycaon β americana* applied to it by Hamilton Smith in 1827[**] is invalidated by the *Canis alopex americanus* of Kerr, 1791,[††] and the *Canis familiaris α americanus* of Gmelin, 1788.[‡‡] It may be known as *Canis floridanus*.[§§]

— *Gerrit S. Miller, Jr.*

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[*] Hist. Nat., IX, pp. 362–370, pl. XLI.

[†] Säugthiere, pl. LXXXIX (only vernacular name used in text, III, p. 353), 1776.

[‡] See Trouessart, Faune Mamm. d'Europe, p. 90, 1910.

[§] Mamm. North Amer., p. 108, 1857.

[||] Fauna Boreali-Americana, pp. 70–72, 1829.

[¶] Proc. Boston Soc. Nat. Hist., XXVIII, p. 233, March, 1898.

[**] Griffith's Cuvier, Animal Kingdom, V, p. 141.

[††] Animal Kingdom, p. 142.

[‡‡] Syst. Nat., 13th ed., I, p. 69.

[§§] Type adult female (skin and skull) No. $\frac{12376}{38488}$ U. S. National Museum, Horse Landing, St. Johns River, Florida, August 12, 1890, presented by Dr. W. L. Ralph. General color light buffy gray faintly clouded with black on upperparts; muzzle, legs and feet with strong ochraceous wash. Skull and teeth much as in *Canis lycaon*, but premolars larger and upper carnassial less robust; condylobasal length about 216 mm., zygomatic breadth 121.5 mm.

THE EARLIEST NAME FOR THE CAPE RATEL.

The name now in general use for the Cape Honey-Ratel, ***Mellivora ratel*** (Sparrman). Kongl. Vet. Acad. Handl. 1777, Stockholm, p. 147, 1777, is antedated by *Viverra capensis* Schreber, Die Säugthiere, plate 125. Of late years this latter name has been placed in synonymy, as dating from 1778; but according to Sherborn (P. Z. S., 1891, p. 588) the plate was published in 1776. It is obvious that ***Mellivora capensis*** (Schreber), type locality Cape of Good Hope (Schreber, III, p. 451), is the proper name for the Cape Ratel. —*N. Hollister.*

A NEW RECORD FOR *MICROSOREX* IN NEW YORK.

While studying the series of long-tailed shrews belonging to the Lee Museum of Biology at Bowdoin College, I was surprised to find a skin and skull of *Microsorex hoyi* from Canton, New York, received from Miss M. Southworth, November 9, 1903. Through correspondence with Miss Southworth I have learned that the shrew was brought in by the house cat "on an eighty acre farm, well tilled and very level, with no rocks nor woods, and, no doubt, it was caught in a meadow, as the house is surrounded by meadows."

Canton appears to be the second locality in New York State from which *Microsorex* has been obtained, C. H. Merriam* having recorded three specimens from Locust Grove.

—*Manton Copeland.*

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* North American Fauna, No. 10, 1895, p. 90.

Vol. XXV, pp. 97-102 May 4, 1912

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

DIAGNOSES OF SOME NEW GENERA OF AMERICAN BIRDS.

University MAY 10 1912

BY ROBERT RIDGWAY,
Curator, Division of Birds, U. S. National Museum.

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In preparing keys to the genera of families to be included in Part VI of the "Birds of North and Middle America," the writer has found it necessary to establish several new groups, which are briefly diagnosed below.

Ecchaunornis gen. nov.

Type, *Bucco radiatus* Sclater.

Similar to *Nystalus* Cabanis and Heine,* but differing in relatively much shorter and less compressed bill (culmen, from base, much less than half as long as wing), its width at nostrils equal to about one-third the length of exposed culmen.

(Εκχαυνοώ, I puff up; ὄρνις, a bird.)

Species: *Ecchaunornis radiatus* (Sclater); *Ecchaunornis radiatus fulvidus* (Salvin and Godman).

Systellura gen. nov.

Type, *Stenopsis ruficervix* Sclater.

Nearest *Stenopsis*, but differing in the relatively much shorter and less distinctly emarginate tail and very different style of coloration, the sexes not conspicuously different in color and the adult male with lateral rectrices not mostly white.

(I would restrict *Stenopsis* to *S. cayennensis*, with, possibly, *S. candicans*, a species I have not been able to examine.)

(Συστέλλω, to abridge; οὐρά, tail.)

Species: *Systellura ruficervix* (Sclater).

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* *Nystalus* Cabanis and Heine, Mus. Hein., iv, Heft. 1, Jan., 1863, 139. Type, *Alcedo maculata* Gmelin.

Antiurus gen. nov.

Type, *Stenopsis maculicaudus* Lawrence.

Nearest to *Stenopsis*, but with tenth (outermost) primary equal to or longer than ninth; bill relatively much smaller and shorter; rectrices relatively much broader, and much wider terminally than basally (instead of the reverse), and pattern of coloration peculiar.

(῎Αντιος, different; οὐρά, tail.)

Species: *Antiurus maculicaudus* (Lawrence).

Setopagis gen. nov.

Type, *Caprimulgus parvulus* Gould.

Nearest *Antrostomus*, but differing in the relatively very small bill, and in the adult male having a white patch on middle portion of primaries (none of the numerous species of *Antrostomus* being thus marked).

Σής, σητός, a moth; παγίς, trap.)

Species: *Setopagis parvulus* (Gould).

Nyctipolus gen. nov.

Type, *Caprimulgus nigrescens* Cabanis.

Differing from *Antrostomus* Gould in having the whole tarsus (except plantar surface) feathered; nostrils narrow, longitudinal, opening laterally beneath a tumid operculum; and primaries either uniform black or with a white spot on inner web of seventh and eighth, or seventh, eighth, and ninth.

(Νυκτιπόλος, roaming by night.)

Species: (1) *Nyctipolus nigrescens* (Cabanis); (2) *Nyctipolus whitelyi* (Salvin).

Ptilonycterus gen. nov.

Type, *Caprimulgus ocellatus* Tschudi.

Agreeing with *Otophanes* Brewster and *Nyctagreus* Nelson in possessing a conspicuous erectile jugular lappet or flap (the feathers of the chest being abruptly much longer than those of breast and abdomen), but differing from both in having the feathers of the pileum broad and blended, those of the supra-auricular region not noticeably elongated, feathering of lores denser, longer, and more erect, and tarsus shorter than middle toe without claw and feathered for upper half or more.

(Πτίλον, a feather; νυκτερίς, a bat.)

Species: *Ptilonycterus ocellatus* (Tschudi).

This genus may possibly have already been named, the generic term *Nyctiphrynus* Bonaparte having been used in connection with the type species. The first publication of *Nyctiphrynus* dates 1854 (*Conspectus Systematis Ornithologiæ*, p. 35), where it is a pure *nomen nudum.* Gray adopts it in his "Hand List" (I, p. 59) as a subgenus of *Caprimulgus*, and includes under it only *C. ocellatus*, and cites 1857, which probably refers to the "*Rivista Contemp.* 1857, p. 9," as cited by Waterhouse. Unfortunately I am not able to consult the latter, however, which, according to Dr. Richmond, is not in any Washington library.

Micrococcyx gen. nov.

Type, *Coccyzus pumilus* Strickland.

Differing from *Coccyzus* Vieillot in much shorter and more rounded wing-tip, the longest primaries exceeding distal secondaries by only one-fourth the length of wing, the ninth primary shorter than fourth, the tenth (outermost) much shorter than distal secondaries; tail very little longer (sometimes shorter) than wing, slightly rounded or nearly truncate.

(**Μικρός**, small; *κόκκυξ*, a cuckoo.)

Species: (1) ***Micrococcyx pumilus*** (Strickland); (2) ***Micrococcyx cinereus*** (Vieillot).

Diopsittaca gen. nov.

Type, ***Psittacus nobilis*** Linnæus.

Differing from *Ara* in much smaller size (wing less than 300 mm.); bill much broader, more swollen laterally, the width of maxilla at base equal to much more than half the length (chord) of culmen, the greatest width of mandible equal to length (chord) of gonys; maxillary unguis extremely attenuated and acute (as in *Ognorhynchus* Gray); tail shorter than wing, and cheeks normally feathered. Differing from *Ognorhynchus* in naked lores, absence of an exposed post-mandibular naked area, and other characters.

(**Δῖος**, noble; *ψιττάκη*, a parrot.)

Species: (1) *Diopsittaca nobilis* (Linnæus); (2) *Diopsittaca hahni* (Souancé).

Orthopsittaca gen. nov.

Type, ***Psittacus manilatus*** Boddaert (*P. makawuanna* Gmelin).

Differing from *Ara* Cuvier in relatively much smaller bill, with culmen very slightly if at all longer than outer hind toe with claw; anterior lateral outline of cere straight or very faintly concave, without convexity in front of nostril; excision of mandibular tomium deep and narrow; corrugations on palatal surface of maxillary unguis obsolete, and sides of forehead naked.

(**Ὀρθός**, straight; *ψιττάκη*, a parrot.)

Species: *Orthopsittaca manilata* (Boddaert).

Thectocercus gen. nov.

Type, ***Psittacus acuticaudatus*** Vieillot.

Differing from *Conurus* Kuhl in having the maxilla swollen laterally, much wider than deep at base, broadly arched in transverse section, its tip attenuated, acute, and ridged; feathers of cheeks narrow, distinctly outlined, cere naked behind nostrils, and inner webs of rectrices mostly red.

(Θηκτός, sharp; κέρκος, tail.)

Species: *Thectocercus acuticaudatus* (Vieillot).

Psilopsiagon gen. nov.

Type, *Trichoglossus aurifrons* Wagler.

Differing from *Bolborhynchus* Bonaparte in having the feathers of the cheeks short (normal), not covering sides of mandible; tail shorter than wing; bill relatively longer and narrower, the length of culmen nearly equal to that of tarsus, and much greater than width of mandible at base, the tip of maxilla (unguis) narrow, obtusely pointed, no gray on cheeks, throat, etc., nor brown on pileum, the latter green, the primaries blue.

(Ψιλός, naked; σιαγών, jaw bone.)

Species: *Psilopsiagon aurifrons* (Wagler).

Grammopsittaca gen. nov.

Type, *Psittacula lineola* Cassin.

Nearest *Psilopsiagon* but differing from both that genus and *Bolborhynchus* in having the cere much less tumid, broadly subfusiform (by encroachment of frontal feathering on posterior portion), tail not more than two-thirds (sometimes but little more than half) as long as wing, graduated for much less than half its length; tarsus much shorter than outer front toe without claw; and plumage without either gray or yellow (green, sometimes barred or spotted with black).

(Γραμμη, line; ψιττάκη, a parrot.)

Species: (1) *Grammopsittaca lineola* (Cassin); (2) *Grammopsittaca andicola* (Finsch).

Nannopsittaca gen. nov.

Type, *Brotogerys panychlorus* Salvin and Godman.

Differing from *Urochroma* Bonaparte in having the bill much more slender, the depth of maxilla at base equal to much less than half the length (chord) of culmen, the latter less strongly decurved; tarsus as long as outer front toe without claw; tenth (outermost) primary with inner web emarginated near tip; orbital region mostly feathered; rectrices wholly green, and size smaller (wing less than 95 mm.).

The type species of this genus has hitherto been referred either to *Brotogerys* or *Bolborhynchus*, but evidently it is far more closely allied to *Urochroma*, from which, however, it is very distinct generically.

(Νάννος, dwarf; ψιττάκη, a parrot.)

Species: *Nannopsittaca panychlora* (Salvin and Godman).

Hapalopsittaca gen. nov.

Type, *Psittacus amazoninus* Des Murs.

Differing from *Pionopsitta* Bonaparte (type and only species *Psittacus* *pileatus* Scopoli) in having the bill relatively much narrower, with maxilla compressed laterally, its width at base equal to but little more than half the length (chord) of gonys and much less than three-fourths the length (chord) of culmen; maxillary tomium without distinct, if any, post-ungual notch or "tooth"; base of mandible beneath narrowly and deeply concave; tenth (outermost) primary equal to seventh; lores densely feathered; auricular feathers narrow, somewhat elongated; tail dusky blue distally, dusky red proximally, and sexes alike in color.

(**'Απαλός**, delicate; *ψιττάκη*, a parrot.)

Species: *Hapalopsittaca amazonina* (Des Murs).

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PROCEEDINGS
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DESCRIPTIONS OF FIVE NEW BIRDS FROM THE WEST COAST OF SUMATRA.

BY CHARLES W. RICHMOND.

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The following descriptions of supposed new subspecies from islands off the west coast of Sumatra have been in manuscript for several years. They are based chiefly upon collections made by Dr. W. L. Abbott in 1903 and 1904, the first collection received from Dr. Abbott having been reported upon in 1903 (Proc. U. S. Nat. Museum, XXVI, pp. 485–524).

Muscadivores consobrina babiensis subsp. nov.

Type, No. 179,057, U. S. Nat. Mus., adult male, Pulo Babi, northwest coast of Sumatra, January 13, 1902; Dr. W. L. Abbott.

Closely related to *M. c. consobrina* (Salvadori), but somewhat larger. Length (in flesh), 432; wing, 245; tail, 149; tarsus, 35; culmen, 24 mm. A female measures: Length, 419; wing, 234; tail, 139; tarsus, 33; culmen, 26. An adult male from the neighboring island of Lasia is even larger than the type: Length, 445; wing, 246; tail, 147; tarsus, 35.5; culmen, 25.

Five specimens of this subspecies were obtained by Dr. Abbott on Babi and Lasia. They have been compared with over forty good examples of *M. c. consobrina* from Simalur, Nias, Batu and Pagi islands, and are larger than any of the latter. The measurements of *M. c. consobrina* vary as follows: Length (in flesh), males, 390–430; females, 385–410; wing, males, 218–241; females, 215–231; tail, males, 118–140; females, 120–129 mm.

The two little islets, Babi and Lasia, off the southeast coast of Simalur, are also the home of *Palæornis major*, a large form of *P. fasciatus*, and *Hypothymis abbotti*, one of the largest species of its genus.

Thriponax javensis büttikoferi subsp. nov.

Type, No. 179,685, U. S. Nat. Mus., adult male, Siaba Bay, Nias Island, March 18, 1903; W. L. Abbott and C. B. Kloss.

Similar to *T. j. javensis* (Horsfield), but with the thighs and flanks uniform buff, without blackish bars or spots. Length (in flesh), 462; wing, 228; tail, 167; tarsus, 38.5; culmen, 57 mm.

Three adults only were collected, but Dr. Abbott notes it as "common" on Nias, and Dr. Büttikofer has already recorded* presumably the same form from the island under the name *T. javensis*.

Dicæum sumatranum batuense subsp. nov.

Type, No. 180,073, U. S. Nat. Mus., adult male, Pulo Pinie, Batu Islands, west coast of Sumatra, March 3, 1903; W. L. Abbott and C. B. Kloss.

Near *Dicæum s. sumatranum* Cabanis, but bill smaller; center of chin, throat and chest buffy white, as in *D. cruentatum* (but the light area not so broad); sides of head, neck and body slightly darker than in *D. s. sumatranum*. Length (in flesh), 90; wing, 48; tail, 25; tarsus, 11; culmen, 12 mm. The female is similar to *D. cruentatum*, but the white median line on the underparts is narrower. Both *D. s. sumatranum* and the new form differ from *D. cruentatum* in having the red of the upperparts lighter, with the sides of the neck, body and flanks smoky gray instead of blackish; the scapulars have a greenish (instead of bluish) gloss, and the forehead is black.

Alcedo meninting proxima subsp. nov.

Type, No. 179,777, U. S. Nat. Mus., adult male, North Pagi Island, west coast of Sumatra. January 4, 1903; Dr. W. L. Abbott.

Differs from *Alcedo m. meninting* Horsfield, in having a greenish tinge to the feathers of the crown (present in some specimens of the latter, however), and a generally lighter and more greenish shade to the blue colors of the upper surface (scapulars, wing-coverts, outer webs of secondaries, etc.). The spots on the wing-coverts are more pronounced, and lighter in color. Length (in flesh), 169; wing, 71; tail, 28; tarsus, 9.5; culmen, 47 mm.

Five specimens were procured, and Dr. Abbott noted the form as "common" on the Pagis.

No direct comparison has been made with *A. m. rufigastra* Walden,† but judging from the descriptions alone it appears to be not the same, and the Pagi Islands are considerably beyond the known range of *A. m. rufigastra*.

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* Notes Leyden Museum, XVIII, 1896, 170.

† *Alcedo beavani* Walden is simply a substitute name for *A. rufigastra*.

Copsychus saularis pagiensis subsp. nov.

Type, No. 180,077, U. S. Nat. Mus., adult male, North Pagi Island, west coast of Sumatra, December 22, 1902; Dr. W. L. Abbott.

Colors nearly as in *C. saularis musicus* (Horsfield), but the areas of glossy black are more inclined to greenish, and the sides of the body are washed with gray, paler than in *C. s. musicus.* Size considerably larger than in the latter. Length (in flesh), 252; wing, 113; tail, 100; tarsus, 32.5; culmen, 29.5 (bill, from gape, 33.5) mm. The female measures: Length (in flesh), 243; wing, 111; tail, 97.5; tarsus, 31; culmen, 27.5 mm. A male of *C. s. musicus*, from Loh Sidoh Bay, west Sumatra, measures: Length (in flesh), 235; wing, 106; tail, 93; tarsus, 32.5; culmen, 24 (bill, from gape, 27.5) mm.

Only one pair collected, and Dr. Abbott refers to it as "not common, a few about the clearings."

Vol. XXV, pp. 107-108 June 29, 1912

PROCEEDINGS
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A NEW SUBSPECIES OF PRONGHORN ANTELOPE FROM LOWER CALIFORNIA.

BY E. W. NELSON.

This subspecies is based on a series of twelve specimens, all from the type locality and neighboring district, now in the Biological Survey Collection. Comparisons were made with about an equal series of *mexicana* and an even larger number of *americana* from various parts of the western United States.

Antilocapra americana peninsularis subsp. nov.

Type No. 178,445, adult male, U. S. National Museum, Biological Survey Collection, from 45 miles south of Calmalli, Lower California, Mexico; collected February 4, 1912, by E. W. Funcke.

Distribution.—Middle Lower California, south to the head of Ballenas Bay in about 27° north latitude, and north on the west coast to about 29° 30′; on the gulf side to beyond 32°, to the southern end of the Colorado Desert.

Subspecific characters.—Compared with typical *Antilocapra americana* from North Dakota the present form agrees in the dark sooty brown facial markings strongly contrasting with the surrounding white and dark reddish-buff areas (facial area distinctly paler in *mexicana*); ears of *peninsularis* much darker about tips; in typical *americana* as well as in *mexicana*, terminal half of ears bordered with a narrow black line and a few scattered black hairs on outside (back), in *peninsularis* this black border much heavier and terminal third of outside (or back) mainly blackish, the terminal inch commonly nearly pure black; in *americana* rufous area on top of tail extends forward partly dividing white rump patch but usually becoming obsolescent before reaching rufous area on back; in *peninsularis* this rufous band extends forward forming a strongly marked bar about an inch wide from tail to rufous of back thus definitely dividing white rump patch; horns of *peninsularis* shorter and actually as well as proportionately thicker laterally at base than in *americana* or *mexicana*, with the surface, up to prongs, much roughened and covered with numerous small knobs and wart-like protuberances; horns in this form also average much more upright and less diverging than in either of the other forms; molar series heavier than in *americana* and much heavier than in *mexicana.* Size about the same in all three subspecies.

Remarks.—It was unexpected to find the antelope of the remote and excessively hot arid deserts of Lower California more like typical *americana* in the dark coloring of the head than like the pale *mexicana.* While the differences noted are not very striking they appear sufficient to characterize a good local form. Antelope formerly ranged over nearly the entire length of Lower California but are now gone from a large part of their ancient range and their steadily decreasing numbers indicate their early extinction throughout the peninsula.

Vol. XXV, pp. 109-110 June 29, 1912

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SUBSPECIES OF MOUNTAIN SHEEP FROM WESTERN TEXAS AND SOUTHEASTERN NEW MEXICO.

BY VERNON BAILEY,
U. S. Biological Survey.

In my report on the mammals of Texas* I referred the mountain sheep of the Guadalupe Mountains to *Ovis mexicanus* Merriam, mainly on a comparison of external characters in the old rams. Recently in taking the matter up more thoroughly I have had occasion to compare series of female skulls and find that they show excellent and very constant cranial characters, which in the old rams have become partially concealed by the excessive bone growth and closely ankylosed sutures. In the light of these facts it is now impossible to refer the sheep from the Guadalupe Mountains of Texas and New Mexico to *mexicanus* and equally so to *auduboni* or *canadensis*,† and a subspecific name seems best to express its relationship. Its actual relationship with typical *canadensis* will not be known until much more critical work is done on the group with more material than has been brought together. The best cranial characters in mountain sheep are shown by four- or five-year-old females, and if collectors will bear this in mind and save at least as many females as males the future value of museum material will be greatly increased.

Ovis canadensis texianus subsp. nov.

Type from Guadalupe Mountains, Texas, ♀ ad. skin and skull, 118,255, U. S. National Museum, Biological Survey Collection, collected September 2, 1902, by Vernon Bailey. Original No. 7971.

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* Biological Survey of Texas, North American Fauna No. 25, U. S. Biological Survey, Dept. of Agric., Oct. 24, 1905.

† In using the name *canadensis* instead of *cervina* I am following the custom of the Biological Survey in not rejecting a name in good current use for one without a definite claim to priority.

General characters.—In size and general appearance very similar to *Ovis mexicanus*, but slightly darker in coloration, with facial part of skull, nasals and palate extremely narrow.

Color.—In specimen collected September 2, upper parts, except the usual large white rump patch, dull buffy brown or soiled brownish gray; nose whitish; rump patch pure white with medium dark line very narrow and not continuous from tail to dark area of back; belly white posteriorly; whitish lines down inner side of hind legs to hoofs, and down front legs usually only to dewclaws (in the type reaching to the hoofs).

Cranial characters.—Skull long and narrow, with the heavy molars of *auduboni* and *mexicanus*, but different from all other species of the United States and Mexico in the relatively narrow muzzle, nasals and palate in both sexes. Adult males with medium heavy pale yellowish horns as in *mexicanus*, but face more concave; upper molars arranged in a nearly straight line. Adult female with long, thin, slender yellowish horns, face less flat and orbits more prominent than in *mexicanus;* upper molar series nearly straight, nasals conspicuously long and narrow.

Measurements.—Type ♀, 4½ years old, from dry specimen; total length, 1530; tail vertebrae imperfect; hind foot, 355; ear from notch, 90; from crown, 100. Adult male, topotype No. 110,388, measured dry; total length, 1490; tail vertebrae 70; hind foot, 370; ear from notch, 95; from crown, 110.

Skull of type: basal length, 246; alveolar length of upper tooth row, 90; of lower tooth row, 92; width over orbits, 150; width at base of horns, 100; greatest width of nasals, 35; width of palate between alveoli of next to hind molars, 42. *Skull* of five-year-old male, topotype, No. 110,047; basal length, 270; alveolar length of upper tooth row, 89; of lower, 91; greatest width of nasals, 48; of palate, 46; circumference of horns at base of fourth annual ring, 345; at base of fifth annual ring, 360.

Remarks.—The skull of the female in this form presents the opposite extreme from the conspicuously broad, flat face and nasals of *mexicanus* and presents another extreme of difference from the dark horns, light and well arched molar series, small short nasals and wide rostrum of *canadensis ;* it agrees with *auduboni* of the northern Badlands only in the heavy dentition.

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PROCEEDINGS

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NEW SPECIES OF ANISOPIDÆ (RHYPHIDÆ) FROM TROPICAL AMERICA.

[DIPTERA: NEMOCERA.]

BY FREDERICK KNAB.

While the Anisopidæ are a very widely distributed group, but few species are known and very little is known of their life-histories. One of the species herein described (*Anisopus picturatus*) is of special interest as having been bred from epiphytic Bromeliaciæ, the larvæ presumably inhabiting the water which collects at the bases of the leaves. The second species is peculiar in its unusually robust make-up and in the general dark coloration.

I am unable to follow Coquillett in adopting the name *Sylvicolæ* Harris for the genus generally called *Rhyphus*; the name hardly can be considered a generic one and does not appear to have been so intended by its author. In case Harris' name is used, it should be converted to the singular, *Sylvicola*. Neither can I accept *Phryne*, published by Meigen in 1800 without including a species. Therefore I adopt *Anisopus* Meigen (1803), which has priority over *Rhyphus* Latreille (1805).

Anisopus picturatus sp. nov.

Male.—Mouth-parts and palpi yellow. Antennæ with the scape yellowish brown, the flagellum black. Mesonotum brownish black with two indistinct longitudinal stripes on the dorsum and the lateral margins yellowish brown. Scutellum yellowish brown, dark at base. Postnotum dull brownish yellow. Pleuræ and coxæ dull brownish black. Abdomen brown, the first segment brownish yellow except at base, the others with yellowish apical margins.

Wings subhyaline with a dull yellowish tinge and spotted with dull brown. Auxiliary vein contiguous with the first, or nearly so, in nearly its whole length. The costal cell is entirely and uniformly brown. There is a large dark brown spot at the apex of the marginal cell and another at its middle, both extending over diffusedly into the submarginal cell; base of marginal cell clear. The veins limiting outwardly the basal and discal cells enclosed in deep brown spots. A narrow, dark spot crosses the first posterior cell obliquely below the apical spot of the marginal cell; another similar spot crosses the second and third posterior cells farther out, about at their middle. At the tip of the wing, independent of all these spots, is a broad brown area, sharply and darkly limited inwardly on the submarginal and first posterior cells, becoming paler and indistinct outwardly and posteriorly. Lower branch of the fifth vein margined with brown beyond the furcation. Halteres pale.

Legs ochreous yellow marked with brownish black. Anterior legs with the femora and tibiæ yellow, the tarsi with the tip of the first and all of the succeeding joints infuscated. Middle and hind femora yellow at base, dark beyond, a yellow ring before apex. Middle tibiæ yellow, with an indistinct dark ring at base and apex. Hind tibiæ with distinct and broader dark basal and apical rings. Middle and hind tarsi with apices of first and second joints dark, the last three joints strongly infuscated.

Length: body, about 6 mm.; wing, 5.5 mm.

Cartago, Costa Rica, 1500 meters, September-October, bred from epiphytic bromeliads by C. Picado; one male and one female.

Type.—Cat. No. 14,955 U. S. Nat. Mus.

In the female the mouth-parts and palpi are darker. The mesonotum shows a narrow yellow longitudinal line medianly and outwardly from this a broad gray longitudinal stripe, another gray stripe at the lateral margin. The mesonotum might also be described as gray with dark longitudinal stripes, the middle one divided by a fine yellow line. The discrepancy in the thoracic pattern of the two specimens is attributable either to difference in age or to the condition of the specimens, these having been preserved in fluid. The wing pattern in the female is more distinct and the markings slightly broader. The species differs obviously from all of the described ones in the wing pattern and the coloration of the legs.

Anisopus infumatus sp. nov.

Female.—Form rather robust. Head black. Mouth-parts and palpi yellowish brown. Antennæ with the scape yellowish brown, the flagellum black, the last joint pale yellow. Mesonotum very deep brown, an ill-defined, rich brown, double, median longitudinal stripe. Scutellum blackish. Postnotum yellowish brown. Pleuræ deep brown, coxæ brownish black. Abdomen dull black, the first segment with an indistinct pale brown blotch above and at the sides beneath.

Wing deep brown, darkest along costa and towards apex, becoming paler posteriorly. The stigmatal mark at the apices of the subcostal and marginal cells rather ill-defined and divided by an indistinct paler spot. A large pale spot crosses the submarginal cell and extends into the first posterior cell, its base resting against the tip of the second vein. Another pale spot extends across the base of the first posterior cell and across the apical part of the discal cell. A third pale spot extends across the marginal cell at its base, across the first basal cell, and broadens out in the apical portion of the second basal cell. The veins limiting the basal and discal cells outwardly are surrounded by very dark brown.

Front legs brownish yellow, the basal two-thirds of the femora brown and the apices of the tibiæ and the last three tarsal joints somewhat darkened. Middle and hind femora brownish black, with an ill-defined brownish yellow ring near the apex. Middle tibiæ brownish yellow, dark at base. Hind tibiæ yellowish brown at the middle, darker at base and apex. Middle and hind tarsi with the first joint brownish yellow, darker at the apex, the others dark.

Length: body, about 5 mm.; wing, 4.5 mm.

Trinidad, West Indies, June, July, 1905 (A. Busck).

Type.—Cat. No. 14,956 U. S. Nat. Mus.

Three females and two males. *Anisopus infumatus* apparently resembles *A. guttatus* Schiner, described from Brazil, but differs in many details of wing and leg coloration.

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A NEW SUBSPECIES OF PRONGHORN ANTELOPE FROM LOWER CALIFORNIA.

BY E. W. NELSON.

This subspecies is based on a series of twelve specimens, all from the type locality and neighboring district, now in the Biological Survey Collection. Comparisons were made with about an equal series of *mexicana* and an even larger number of *americana* from various parts of the western United States.

Antilocapra americana peninsularis subsp. nov.

Type No. 178,445, adult male, U. S. National Museum, Biological Survey Collection, from 45 miles south of Calmalli, Lower California, Mexico; collected February 4, 1912, by E. W. Funcke.

Distribution.—Middle Lower California, south to the head of Ballenas Bay in about 27° north latitude, and north on the west coast to about 29° 30′; on the gulf side to beyond 32°, to the southern end of the Colorado Desert.

Subspecific characters.—Compared with typical *Antilocapra americana* from North Dakota the present form agrees in the dark sooty brown facial markings strongly contrasting with the surrounding white and dark reddish-buff areas (facial area distinctly paler in *mexicana*); ears of *peninsularis* much darker about tips; in typical *americana* as well as in *mexicana*, terminal half of ears bordered with a narrow black line and a few scattered black hairs on outside (back), in *peninsularis* this black border much heavier and terminal third of outside (or back) mainly blackish, the terminal inch commonly nearly pure black; in *americana* rufous area on top of tail extends forward partly dividing white rump patch but usually becoming obsolescent before reaching rufous area on back; in *peninsularis* this rufous band extends forward forming a strongly marked bar about an inch wide from tail to rufous of back thus definitely dividing white rump patch; horns of *peninsularis* shorter and actually as well as proportionately thicker laterally at base than in *americana* or *mexicana*, with the surface, up to prongs, much roughened its whole length. The costal cell is entirely and uniformly brown. There is a large dark brown spot at the apex of the marginal cell and another at its middle, both extending over diffusedly into the submarginal cell; base of marginal cell clear. The veins limiting outwardly the basal and discal cells enclosed in deep brown spots. A narrow, dark spot crosses the first posterior cell obliquely below the apical spot of the marginal cell; another similar spot crosses the second and third posterior cells farther out, about at their middle. At the tip of the wing, independent of all these spots, is a broad brown area, sharply and darkly limited inwardly on the submarginal and first posterior cells, becoming paler and indistinct outwardly and posteriorly. Lower branch of the fifth vein margined with brown beyond the furcation. Halteres pale.

Legs ochreous yellow marked with brownish black. Anterior legs with the femora and tibiæ yellow, the tarsi with the tip of the first and all of the succeeding joints infuscated. Middle and hind femora yellow at base, dark beyond, a yellow ring before apex. Middle tibiæ yellow, with an indistinct dark ring at base and apex. Hind tibiæ with distinct and broader dark basal and apical rings. Middle and hind tarsi with apices of first and second joints dark, the last three joints strongly infuscated.

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GENERAL NOTES.

THE GENERIC NAMES *CERCOMYS* AND *PROECHIMYS*.

Mr. E. A. Goldman has recently[*] urged that the generic name *Proechimys* for the common Spiny Rats should be dropped in favor of *Cercomys*, given to his *Cercomys cunicularius* by F. Cuvier in 1829. This opinion is based on an identification—in which I entirely concur—of the skull and teeth described and figured as those of *Cercomys cunicularius*, with those of some member of what is usually called *Proechimys*.

But there is one point which has aroused suspicion, namely that a *Proechimys* young enough to have spineless pelage would have teeth in a very different state of wear from those of the figured skull, which is not only adult but old.[†] In *Proechimys* the pelage is always spinous before adult age is reached.

In searching for an animal with spineless fur to which the original figure of *Cercomys cunicularius* could be assigned I have naturally thought of *Thrichomys apereoides* Lund (*Nelomys antricola* Lund, of Winge) which occurs in Minas Geraes and agrees closely with the account and figure of *Cercomys*.

But the difficulty of the *Proechimys*-like skull and teeth still remaining I applied for help to the authorities in Paris, and Dr. Anthony has been good enough to send me the only skull which is there assigned to *Cercomys cunicularius*. To my great interest I find that it *is* a skull of *Thrichomys*, slightly immature, but is clearly not that figured by F. Cuvier as the skull of *Cercomys*.

The facts would therefore appear to be that the original *Cercomys cunicularius* had a skull of *Proechimys* wrongly assigned to it when it was first described in 1829, as may be gathered from the description of the teeth, and that this same skull served for F. Cuvier's description and figures in 1832. How and by whom the "*Thrichomys*" skull now before me, which was received as a "don du Musée de Genève," became identified as a *Cercomys* is not known, but I have no doubt that it is rightly so determined.

With regard to nomenclature it is clear that the animal and not the skull should be looked upon as the primary basis of the name *Cercomys*, for the name itself is based on the rat-like tail, a full figure of the animal is given, and the erroneous description of the teeth only forms quite a subsidiary paragraph, to which typical importance could not be given. Moreover, were we to accept the wrongly allocated skull as the type, the species could never be satisfactorily determined, while the identification of the animal is now practically certain.

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[*] Proc. Biol. Soc. Wash., XXV, p. 94, 1912.

[†] I venture to differ entirely from Mr. Goldman as to the age of this skull, which he supposes to be young. The teeth present are worn down, and the last molar has been lost.

Mr. Goldman's own paper can not be accepted as giving him the authority of a "first reviser," for to have such authority a knowledge of all the pertinent facts is necessary, and Mr. Goldman was naturally unaware of the confusion about the skulls which has been indicated above.

As a result the now familiar name *Proechimys* will remain for the Spiny Rats, while *Cercomys* will be the proper generic name of the three species hitherto referred to *Thrichomys*—these being, therefore, *Cercomys cunicularius* F. Cuv. (1829) (*syn. Thrichomys apereoides* Lund, 1840), *C. fosteri* Thos. (1903) and *C. laurentius* Thos. (1904).

I may note in conclusion that the condition of the tail shown in the original figure of *Cercomys*, widely different as it is from that occurring in adult specimens of "*Thrichomys*," is not unlike what is found in immature specimens of that animal.

—*Oldfield Thomas.*

A CORRECTION OF TWO RECENT NAMES FOR MAMMALS.

In a report upon the mammals collected in Lower California during the "Albatross" Expedition of 1911 (Bull. Am. Mus. Nat. Hist. XXXI, p. 122) Mr. C. H. Townsend describes two new subspecies of pocket mice as *Perognathus penicillatus goldmani* and *Perognathus spinatus nelsoni*. Unfortunately for the standing of these subspecific names both are already in current use as *Perognathus goldmani* (Osgood, N. Am. Fauna No. 18, p. 54, 1900) and *Perognathus nelsoni* Merriam (Proc. Acad. Nat. Sci., Phila., 1894, p. 266). I would therefore propose to substitute the names *Perognathus penicillatus seri* for the first and *Perognathus spinatus occultus* for the second of these new subspecies.

—*E. W. Nelson.*

THE TECHNICAL NAME OF THE TASMANIAN DEVIL.

In 1903* I gave to the Tasmanian Devil the specific name of ***satanicus*** in substitution for that of ***ursinus***, which, though in use since 1808, was technically inadmissible because of its earlier use for the Tasmanian Wombat.

Now, however, I find to my regret that another change is necessary owing to an overlooked name, given in a semi-popular work, having been in existence since 1842, and therefore long antedating ***satanicus***.

This is:

Ursinus harrisi, Boitard, Jardin des Plantes, p. 290, 1842.

The generic name ***Ursinus*** is a synonym of ***Sarcophilus*** (1837), but the specific name would be valid, and the name of the Tasmanian Devil should therefore be ***Sarcophilus harrisi*** Boitard.

—*Oldfield Thomas.*

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* Ann. Mag. N. H. (7), XI, p. 289, 1903.

THE CRANIAL AND DENTAL CHARACTERS OF *CHILOPHYLLA*.*

A small leaf-nosed bat representing the new genus *Chilophylla*† was collected by Dr. Edgar A. Mearns on the Alag River, Mindoro, in December, 1906. The skull and body of this specimen have been mislaid or lost, and the cranial and dental characters of the genus have not yet been described. On July 6, 1911, Mr. Arthur de C. Sowerby obtained a second skin of *Chilophylla* at Port Swettenham, Federated Malay States. Externally this specimen (adult male, No. 175,000 U. S. N. M.) agrees so exactly with the type of *C. hirsuta* that I can detect no peculiarities that seem of specific importance. Its measurements, compared with those of the type (adult female) in parenthesis are: head and body, 29 (33); tail, — (7); tibia, 13.6 (13.6); foot, 6.2 (6.4); forearm, 34.2 (33.8); thumb, 8.2 (8.2); its metacarpel, 6.2 (6.2); second finger, 33 (32); third finger: metacarpel, 26 (24.2); first phalanx, 6 (6.2); second phalanx, 22 (22); fourth finger: metacarpel, 27 (25.4); first phalanx, 7.6 (7.8); second phalanx, 9.2 (8.6); fifth finger: metacarpel, 29 (27.4); first phalanx, 8.8 (8.4); second phalanx, 9 (10.2); ear from meatus, 14 (12); condylobasal length of skull, 13.0; zygomatic breadth, 6.6; breadth across nasal swellings, 3.6; interorbital constriction, 2.0; breadth of braincase, 6.4; mandible, 8.2; maxillary toothrow, 4.8; mandibular toothrow, 5.0.

The skull of this specimen is perfect. It furnishes the following characters to complete the diagnosis of the genus: Skull like that of a small *Hipposideros* in general features, but with nasal swellings very small (even more reduced than in *Cloeotis*; practically the entire swelling lies behind level of antorbital foramen), and maxillaries and premaxillaries conspicuously produced anteriorly, the length of premaxillary fully twice median length of palate, the distance from level of front of canines to upper margin of nares about 1½ times that from upper margin of nares to narrowest portion of interorbital constriction. Dental formula as in *Hipposideros*; upper canine strongly projecting forward, its shaft with large anterior and posterior secondary cusps, the points of which lie in same horizontal plane as points of paracones of molars; large premolar more reduced than in the related genera; posterior lower premolar with shaft compressed laterally, the form of the cusp without evident resemblance to that of protoconid of first molar.

—*Gerrit S. Miller, Jr.*

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* By permission of the Secretary of the Smithsonian Institution.

† Miller, Proc. U. S. Nat. Mus., XXXVIII, p. 395. August 19, 1910.

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WOOTONELLA, A NEW GENUS OF CARDUACEAE.

BY PAUL C. STANDLEY.

[Published by permission of the Secretary of the Smithsonian Institution.]

In 1853 Doctor Gray described, in the second part of Plantae Wrightianae,[*] a plant which he called *Ximenesia encelioides* var. *nana*. The brief description reads:

Caulibus depressis vel assurgentibus vix spithameis; ramis monocephalis; ligulis parvis discum vix superantibus; acheniis dense pubescentibus pachypteris.

The type locality is stated as "Around the dwellings of Prairie-dogs, between the Limpio and the Rio Grande," Texas. It is added that "Here this dwarf variety abundantly occurs, unmixed with the ordinary state of the species."

Even this brief diagnosis shows that the plant is very unlike *Ximenesia encelioides*. Doctor Gray makes no mention of his var. *nana* in the Synoptical Flora; but Dr. B. L. Robinson, in his revision of the genus Verbesina,[†] recognizes it as a species, under the name *Verbesina nana*. The description given by the second author is incomplete in one or two particulars.

The writer was puzzled for some time by an anomalous composite received from the Pecos Valley of eastern New Mexico, which, while manifestly related to the genera Verbesina and Ximenesia, agreed with nothing in the Synoptical Flora. It was so unlike the common weed, *Ximenesia exauriculata*, that it was not once associated generically with that species, until a description of the plant was found in Doctor Robinson's monograph of the genus, and correlated with fragmentary herbarium material of some of the collections cited.

This comparatively rare plant differs in so many respects from the genus Ximenesia, to which it is most closely related, that it seems worthy of generic rank. It is a perennial, propagating by slender rootstocks, while all the species of *Ximenesia* are annuals and of much greater stature. The paleae of the disk are very narrow (almost filiform) and persistent, rather than broad and deciduous. The wings of the achenes, also, are corky-thickened at the apex, while in Ximenesia they are comparatively thin. The most conspicuous difference is to be found in the development of the achenes: in Ximenesia all the flowers are fertile, while in this the disk flowers are sterile.

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[*] Pl. Wright. 2: 92.

[†] Proc. Amer. Acad. 34: 513. 1899.

The genus is named for Mr. E. O. Wooton, who first collected the plant in good fruit, near Artesia, New Mexico, in 1905. It is appropriate that a plant peculiar to the Southwest should be named for one who has done more than any other, or almost more than all others combined, to make known the flora of New Mexico. A genus Wootonia, also of the Carduaceae, named by Dr. E. L. Greene in 1898, proves to be the same as the older Dicranocarpus.

Wootonella Standley.

Low perennial, 20 cm. high or less, with slender deep-seated rootstocks; stems slender, simple or branched, ascending, canescent; lower leaves opposite, the upper alternate, 3 to 5 cm. long, irregularly dentate, narrowed into winged petioles, these mostly dilated and dentate at the base; heads large, 15 to 20 mm. broad, solitary, on naked terminal peduncles; bracts foliaceous, canescent, 8 to 15 mm. long, more or less unequal; rays rather pale yellow, conspicuously exceeding the involucre, toothed at the apex; ray flowers fertile, the disk flowers sterile; paleae very narrow, nearly filiform, persistent; achenes obovate or oblong, villous, broadly winged, the wings corky-thickened near the apex; pappus none.

Wootonella nana (A. Gray) Standley.

Ximenesia encelioides nana A. Gray, Pl. Wright. 2: 92. 1853.
Verbesina nana B. L. Robinson, Proc. Amer. Acad. 34: 543. 1899.

The following specimens have been examined.

Texas: Kent, 1902, *Tracy & Earle* 385; *Mexican Boundary Survey* 589.

New Mexico: Artesia, August 2, 1905, *Wooton*.

Mexico: La Ventura, Coahuila, 1896, *E. W. Nelson* 3918.

The New Mexican specimens are the only ones seen in which the heads are fully developed. The collections of the Mexican Boundary Survey are very immature. Specimens of this plant are rare in collections; but it is said to be a common weed in cultivated, usually alkaline, fields of the Pecos Valley.

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PROCEEDINGS
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University Library
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DESCRIPTION OF NEW FISHES OF BERMUDA.

BY TARLETON H. BEAN.

In February, 1912, the author visited Bermuda at the request of the Fishery Board. During his stay at the islands a number of species of fishes were obtained through Mr. L. L. Mowbray, who is now director of the Boston Aquarium. The recent collections of Mr. Mowbray have added 34 species of fishes to the Catalogue which I published in 1906 in Vol. VII, No. 2, Zoölogical Series, Field Columbian Museum, Publication 108, bringing the total number of known species at the present time to 296.

Some of the types of the new species are in the U. S. National Museum while others which are represented by only a single individual are in the Museum of the Bermuda Natural History Society.

Of the species believed to be undescribed, the account of one, *Emblemaria markii*, is contributed by Mr. Louis L. Mowbray. The entire list of additions to the fish fauna since the publication of the Catalogue of 1906 is as follows:

Manta birostris
Ahlia sp. nov.
Lycodontis, resembling *verrilli*
Channomuraena vittata
Muraena sp. nov.
Sardinella pinnula
Lampanyctus crocodilus
Stolephorus viridis
Holocentrus puncticulatus
Holocentrus brachypterus
Scomberomorus maculatus
Ruvettus pretiosus
Decapterus sanctæ-helenæ
Pomatomus saltatrix
Eucrotus ventralis
Pempheris mulleri
Parasphyraenops atrimanus
Alphestes afer
Anthias louisi
Lutianus hastingsi

Iridio maculipinna
Pseudoscarus plumbeus
Canthidermis sobaco
Cantherines pullus
Alutera monoceros
Pseudomonacanthus amphioxus
Lagocephalus pachycephalus
Pontinus microlepis
Cyclopterus lumpus
Lophogobius cyprinoides
Eleotris pisonis
Emblemaria markii
Cœlorhynchus occa

Several unidentified species of Scopelidæ are in the collection made by Mr. Mowbray so that there are really about 300 species of fishes that have been recognized in Bermuda by naturalists.

Sardinella pinnula sp. nov.

D. ii, 16; A. 16 (last two resembling finlets); V. 10; P. 16; scales 42. Head 4½; depth 5; ventral scutes 19+16.

Head short; snout 3 in head; lower jaw little projecting; maxilla reaching to below front of eye, its width equal to ½ its length; eye 3⅔ in head; body slender, back straightish. Longest dorsal ray about ½ head, last rays ½ eye; ventral origin under 10th ray of dorsal, midway from tip of snout to caudal base, length of fin 2⅔ in head. Scales very solid, striate; serrations of belly not strong. Anal base as long as head without snout, the last two rays produced and resembling finlets. Tongue and palate with small teeth; vomer toothless. Gillrakers long and numerous.

Steel blue above, silvery below, iridescent. Head, in spirits with golden tints; no opercular spot.

This species is called the "Anchovy" at Hamilton, Bermuda. Numerous specimens were taken by Mr. L. L. Mowbray, February 17, 1912. The types of the species, 3¾ to 5½ inches long, are in the U. S. National Museum. No. 74,086.

Stolephorus viridis sp. nov.

"GREEN FRY."

D. 12; A. 15–16; scales 42.

Head 4; depth 5⅓; eye 3 in head; snout slightly shorter than eye; jaws nearly equal or the lower slightly projecting; snout pointed. Top of head without keel, but with a network of pores which is continued upon and across the nape in a broad band. Maxillary with a few very small, weak teeth; mandible also with weak teeth. The maxillary extends to below front of pupil, its posterior end blunt pointed; gillrakers numerous. Pectoral equal to head without snout, not reaching nearly to ventrals; ventrals midway between caudal base and front of eye, equal to length of snout and eye; insertion of anal far behind end of dorsal, the fin short; origin of dorsal a little nearer to tip of snout than to caudal base, the second dorsal ray ⅔ length of head.

Color pale brown; the silvery lateral band about as wide as the short diameter of the eye; a series of about 9 pearly minute spots each surrounded by a narrow ring of dark brown on the throat in front of the root of the ventrals. These are probably phosphorescent in life, and possibly also the lace-like sculpture on the top of the head. Color in life greenish. The body in life is covered with mucus.

In November, 1910, Mr. L. L. Mowbray observed many individuals of this species on North Rock ledge. The same Fry was exceedingly common around some of the islands near the entrance to Hamilton Harbor in February, 1912.

Types, from 2 to 2¼ inches long, in U. S. National Museum. No. 74,084.

EUCROTUS gen. nov., *Stromateidæ* or *Icosteidæ*.

Body short ovate, deep, strongly compressed, covered with small cycloid scales; scales extending upon the dorsal. Head moderate, the interorbital space broad. Eye moderate, snout short, obtuse, truncate; margin of preopercle with flexible spines; lower margin of subopercle and part of opercle finely serrate. Mouth moderate, oblique, with one row of small teeth in the jaws; vomer and palate toothless. Gill openings wide; gillrakers moderate, close set. One dorsal, high, with a few flexible spines in front, beginning over hind margin of eye, its rays numerous. Anal high and long; caudal round; base of vertical fins closely compressed, with scales extending well upon them; ventrals large, I, 5. Branchiostegals 7; pseudobranchiae present, small. Skeleton soft. Pelagic.

Eucrotus ventralis sp. nov.

D. VII, 34; A. II, 24; V. I, 5; pores in lateral line 106.

Depth of body ½ the distance from front of pupil to base of caudal. Eye slightly longer than snout, 3½ in head. Head 3 in total to caudal base. Mouth moderate, oblique, jaws equal, maxilla reaching to below middle of eye. Interorbital width 3 in head. Dorsal spines graduated, the first short, inserted over hind margin of preopercle, the seventh 2⅗ in head. The pectoral reaches to below base of 14th dorsal ray; ventral as long as pectoral, 1⅓ in head, extending to anal origin. Anal origin midway between tip of snout and base of caudal, the longest ray ⅔ head. Nostrils in front of middle of eye, posterior one much the larger.

Color, grayish silvery with numerous dark spots and blotches. Four short, narrow, dark bands on top of head, the first one behind premaxilla. Many mucus pores on head.

A single example, 5¼ inches long, was taken by Louis L. Mowbray, August, 1911, in floating Sargassum in Eastern Channel, Bermuda. The specimen is in the Museum of the Bermuda Natural History Society.

PARASPHYRÆNOPS gen. nov., *Cheilodipteridæ*.

Allied to *Scombrops*.

Body elongate, covered with small, ctenoid scales. Snout and top of head naked. Opercles scaly. Nostrils double, the posterior the larger. Operculum with two feeble, flat spines, the upper one the larger. Teeth in jaws uniserial, feeble, no canines, vomer and palate with a few weak teeth. Margin of preopercle serrate, the serrations slightly stronger at the angle. Eye large. Maxilla short, little expanded, slipping under the preorbital. Dorsals continuous, deeply notched, with 9 spines and 10 rays, the third spine high, the first and last two short. Anal base short, the fin having 3 spines and 7 rays. Caudal forked. Ventrals under base of pectorals, moderate, with 1 spine and 5 rays. Pectorals broad at base, not elongate, with many rays. Branchiostegals 7. Gillrakers numerous, long and slender, close set. Vertical fins scaleless.

Parasphyrænops atrimanus sp. nov.

Head 3¼; depth 5; eye 3½ in head. D. IX, 10; A. III, 7; V. I, 5; P. 18; scales about 70.

Mouth moderate, oblique, the maxilla extending to below middle of eye, the lower jaw slightly projecting. Suborbital depth ½ diameter of eye.

Third dorsal spine longest, ⅔ head, about equal to base of soft dorsal. Pectoral about ⅔ head. Ventral ½ head, inserted under pectoral. Anal spines graduated, the first very small, the third longest, 2½ in head; base of fin ½ head.

A large black blotch on base of spinous dorsal extending upward a distance equal to long diameter of eye. A jet black spot behind base of pectoral. General color, in spirits, brownish.

An individual 4 inches long was taken from the stomach of a Bonito (*Seriola falcata*) on Argus Bank, 43 fathoms, January 14, 1909, by L. L. Mowbray. A second example, 3¼ inches long, was also obtained by him on the same date and in the same way. The larger type is in the U. S. National Museum. No. 74,085.

Anthias louisi sp. nov.

An *Anthias* belonging to the group containing *formosus* Boulenger.

D. X, 15; A. III, 7; scales 4-35-15; pores 33.

Head 3; depth 2⅔; eye 3 in head; snout 6 in head. The maxilla reaches nearly to below middle of eye; the ventral nearly to vent; the pectoral to the perpendicular through anal origin.

First anal spine ½ eye; second anal spine ½ head; longest anal ray 5 in total length without caudal. Caudal crescentic, none of its rays much produced. No rays in any of the fins produced.

Gillrakers 29, the longest ⅔ eye.

A small black spot at base of 6th and 7th dorsal rays.

Color in life rosy.

A single individual, 3¼ inches long to base of caudal, was obtained by

L. L. Mowbray on Argus bank, April 6, 1908, from the stomach of a rock fish. It is in the Museum of the Bermuda Natural History Society.

This species is named for Louis Septème Mowbray, the youngest chthyologist of my acquaintance.

Pseudoscarus plumbeus sp. nov.

The type specimens of this parrot fish are in the Museum of the Bermuda Natural History Society. Length of types, 16 inches and 18 inches. The specimens described were collected by L. L. Mowbray on the North Shore, within the reefs, August, 1911. The species was first obtained here in 1909.

Head 3; depth $2\frac{2}{3}$; eye 4 in snout (obliquely), $8\frac{1}{2}$ in head; snout $2\frac{1}{4}$; interorbital width $2\frac{2}{3}$; preorbital 4; pectoral $1\frac{1}{2}$; ventral $1\frac{1}{2}$; caudal $1\frac{1}{2}$.

D. IX, 10; A. II, 10; scales 2-25-6.

No canine teeth; lower jaw included when mouth is closed; lateral line interrupted one scale behind end of soft dorsal, lower branch beginning under 9th ray of dorsal, piercing 7 scales; pores of lateral line much branched. Six scales on nape in front of dorsal, the third one much the the largest; 3 rows of scales on cheeks, the lower row containing only one scale; 18 scales along base of dorsals forming a somewhat conspicuous sheath for the fins; 11 scales along anal base also forming a low sheath. Outer caudal rays somewhat produced; inner rays with a convex outline.

Color purplish brown in life; chin, upper lip and lower part of opercle and subopercle vivid, greenish blue becoming emerald green in spirits; nape with bluish green; a spot of bluish green at insertion of first dorsal; a few scales on sides with similar green; margin of dorsal and anal, tips of caudal, upper ray of pectoral and first ray of ventral with a narrow stripe of bluish green.

Pontinus microlepis sp. nov.

A *Pontinus* related to *P. beanorum* and *P. macrolepis*, differing from these in its small scales and other characters, was obtained by Mr. L. L. Mowbray in Bermuda several years ago.

The length of the single individual taken is nine inches; depth two and one-fourth inches; head three and one-half inches.

D. XII, 10; A. III, 5; P. 17; V. I, 5; scales 7–48–14 (pores about 33).

Head $2\frac{1}{5}$; depth $3\frac{1}{3}$; eye $4\frac{2}{3}$; snout $3\frac{1}{2}$.

The maxilla reaches almost to below hind margin of eye. Mandible slightly projecting, with a slight knob closing into an interspace between the intermaxillaries. Interorbital width 3 in snout. Top of snout and top of head with a few weak scales; rest of head scaly; maxilla naked.

Base of pectoral as wide as the eye is long, 7th and 8th rays from bottom the longest, $3\frac{1}{2}$ in length to caudal base, extending to below 11th spine of dorsal, and midway between vent and anal origin.

The ventral reaches nearly to vent, $\frac{1}{2}$ as long as head. Fourth dorsal spine longest, equal to snout; 1st spine 2 in snout; 11th slightly longer than 1st; 12th as long as the eye. Longest dorsal ray 3 in head. Longest anal ray 2½ in head. First anal spine ½ eye; second spine equal to snout; third ¾ snout.

Two slender tentacles above each eye, the first minute, the second about ⅔ eye. A small tentacle at each anterior nostril.

The lower caudal lobe is now slightly the longer. Only 6 gillrakers fully developed with about 8 little tubercles below on the anterior arch. None of the cephalic spines greatly developed. Color rosy.

The type of the species will be in the U. S. National Museum.

Emblemaria markii Mowbray sp. nov.

"Head 3⅔; depth 5⅙; D. XXII, 15; A. 25.

"Body blenniform, scaleless. Jaws with strong incurved conical teeth; maxillary reaching beyond the eye a distance equal to diameter of eye, which is about 4 in head. Snout moderately compressed, slightly less than 4 in head; nasal cirrus equal to diameter of eye; cirrus on upper part of eyeball 2 in head, its tip sometimes branched; a small horn-like cirrus over and in line of posterior margin of eye. Dorsal and anal slightly joined to base of caudal; origin of dorsal beginning behind snout at a distance equal to length of second dorsal spine. In the male the 6th, 7th and 8th dorsal spines are the longest, 3 in total without caudal; in the female the longest dorsal spine is about 6 in length without caudal, and equal to depth of body.

"Color pale brown, with 6 to 10 dark vertical bands on the body; vertical fins dusky; dorsal quite dark, blotched with black; pectorals pale.

"Individuals of 1 to 2½ inches long are common among the mussel beds (*Arca noe*) in Hamilton Harbor, Bermuda. First taken June 20, 1907, in a mussel dredge.

"Named in honor of Dr. E. L. Mark, of Harvard University."

Types in the U. S. National Museum. No. 74,083.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW MEMBER OF THE *PEROGNATHUS PARVUS* GROUP OF POCKET MICE.

BY J. GRINNELL.

[Contribution from the Museum of Vertebrate Zoology of the University of California.]

The *Perognathus parvus* group of pocket mice belongs to the Upper Sonoran and Transition zones in the Great Basin region of the western United States and extreme southern British Columbia. According to the latest reviser of the Genus *Perognathus* (Osgood, N. Amer. Fauna No. 18, 1900, pp. 34–40) the southernmost record station in California for any member of this group is the San Bernardino Mountains, to which locality a species, *P. alticola*, is as far as known restricted. The next southernmost stations for the group are in the Inyo region east of the southern Sierra Nevada, the forms there represented being *Perognathus parvus olivaceus* and *P. p. magruderensis*. Between these two localities, as far as published records show, no form of the group has been obtained.

One of the results of the field work carried on by the California Museum of Vertebrate Zoology during the summer of 1911 was the discovery in the vicinity of Walker Pass, Kern County, California, of the presence of a pocket mouse of the *parvus* group. This member proves to be distinct from both *olivaceus* and *magruderensis* to the northeast, and from *alticola* to the south. The peculiarities of this new form, described below, are so great in amount as to argue against the idea that the *parvus* group is continuously distributed from the Inyo region southwest by way of the Tehachapi and Tejon mountains to the San Bernardino Mountains. The existence of such divergent forms as the new species here described, and *alticola*, point rather towards wholly disconnected habitats. The scanty data at hand indicates further, that the new form is restricted to the middle portion of the Sonoran zone, while *alticola* belongs to lower Transition.

Perognathus xanthonotus sp. nov.

Type from Freeman Canyon, 4900 feet altitude, east slope Walker Pass, Kern County, California; adult ♂, skin and skull, No. 16,154, Univ. Calif. Mus. Vert. Zool.; collected June 27, 1911, by H. A. Carr; orig. No. 111.

General characters.—As compared with *Perognathus parvus olivaceus*, size small, skull small, pelage fine-grained, and coloration wholly different; similar to *P. alticola* but pelage softer and coloration of body very different.

Colors.—Whole dorsal surface between ochraceous-buff and cream-buff, almost perfectly clear on sides of body and head, and but slightly obscured mid-dorsally with scanty dusky tippings to the hairs; feet and lower surface white; ears clothed scantily with white hairs both inside and out; a conspicuous spot of pure white at inferior base of ear; tail well clothed with hairs, and distinctly penicillate, beneath white, above faint cream-buff with a slight dusky tinge on terminal fifth.

Skull.—Distinctly smaller than in *olivaceus*, mastoids and audital bullae notably so; closely similar to *alticola*. Adult perfect skulls of both *xanthonotus* and *alticola*, however, are wanting, and are necessary to any satisfactory comparison with the evidently nearest relative of these two, *olivaceus*.

Measurements.—Type specimen: Total length, 170 mm.; tail vertebrae, 85; hind foot, 22.5. Average of eight adolescents and adults: Total length, 165.3; tail vertebrae, 85; hind foot, 22.5.

Occurrence.—All of the eight specimens of the new form at hand are from the mountain divide east of the Kern River Valley, at the southern end of the Sierra Nevada, in Kern County, California. The exact localities represented are: East slope Walker Pass, alt. 4900 ft., 3; west slope Walker Pass, alt. 4600 ft., 2; west slope of divide at head of Kelso Valley, alt. 5000 ft., 2. These localities are all in the tree yucca belt, an arid faunal division about on the boundary between the Upper and Lower Sonoran life zones.

Remarks.—The coloration of *xanthonotus* is remarkably close to that in *Perognathus longimembris neglectus* and *P. panamintinus bangsi*, these being species of nearby habitats. The first-glance resemblance is striking, but the former has the antitragal lobes and thick tail separating it from the *panamintinus* group. The young of *xanthonotus* as compared with the young of *olivaceus* show much of the yellowness characterizing the adults, especially along the sides of the face and body; the ears are white-haired; but the tail is much more dusky above. *Xanthonotus* agrees with *alticola* in light-colored ears and tail, but differs most emphatically in dorsal body color, *alticola* being very dark, black predominating.

I am indebted to Mr. Frank Stephens for the loan of an adult male topotype of *Perognathus alticola*, one of the very few specimens of this rare species in collections anywhere.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

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THE WARNER MOUNTAIN CONY.

BY J. GRINNELL.

[A contribution from the Museum of Vertebrate Zoology of the University of California.]

Ochotona schisticeps was the first cony described from California (see Merriam, N. Amer. Fauna, No. 2, 1889, p. 11). The type locality is Donner, Placer County, and the form represented there doubtless occurs on most suitable parts of the high central Sierra Nevada. Quite recently (Grinnell, Univ. Calif. Publ. Zool., vol. 10, 1912, p. 125) the cony of the Mount Whitney region was distinguished by the name *Ochotona albatus*. Further examination of available material shows that the cony of the Warner Mountains of extreme northeastern California, and hence of detached habitat from the main Sierran fauna, merits recognition by name. This is here done, as follows :

Ochotona taylori sp. nov.

Type.—♂ ad., No. 11,292, Univ. Calif. Mus. Vert. Zool.; Warren Peak, 9000 ft. alt., Warner Mts., Modoc Co., Calif.; July 18, 1910; collected by W. P. Taylor and H. C. Bryant; original No. 3885.

General characters.—Closely similar to *Ochotona schisticeps* in size and form, but differs from this species in tone of coloration, being distinctly darker and browner both above and below.

Coloration.—Like *O. schisticeps*; black tippings to hairs all over dorsal surface greater in extent; brown tones deeper, approximating vandyke brown, this, mixed with black, pervading the head so that the latter region is but very faintly paler or grayer than the rest of the body; sides warmer brown, nearer mars brown, this deepening over shoulders and thence around to the under surface, so that there is a conspicuous deep russet gular area; chin grayish, but rest of ventral surface pervaded with deep clay color, blending with the brown of throat and sides; tops of both front and hind feet slightly more dusky and brown-washed than in *schisticeps*.

Occurrence.—The Museum of Vertebrate Zoology contains nine skins of this new form (Nos. 11,290–11,298) all from Modoc County, California. These are as follows: Warren Peak, 9000 feet, 4; east face Warren Peak, 8700 feet, 3; Sugar Hill, 6000 feet, 2.

Remarks.—As is usually the case, our specimens were shot with fine shot, some of them at very close range, and the skulls were all more or less broken. It is thus impossible with the present material to ascertain whether or not there are any cranial characters. The young possess the relatively dark coloration of the adults and in just as great degree, this being a good test of the phylogenetic value of such a character.

The name adopted for this new cony is selected as an appropriate recognition of the efficient services of Mr. Walter P. Taylor, Curator of Mammals in the California Museum of Vertebrate Zoology. Furthermore, Mr. Taylor collected the series upon which the new name is based.

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PROCEEDINGS
OF THE
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A NEW CHAMOIS FROM THE APENNINES.

BY GERRIT S. MILLER, JR.

[By permission of the Secretary of the Smithsonian Institution.]

The United States National Museum has recently procured, through the firm of Wilhelm Schlüter of Halle, Germany, two skins and skulls of *Rupicapra* from the Etruscan Apennines in the region of Mount Comero and the headwaters of the Savio River. They were at first supposed to represent *Rupicapra ornata*, but more careful examination shows that they have none of the peculiarities of the Abruzzian chamois. While agreeing with the alpine animal in erectness of the horns and in the color pattern of the neck and throat, they differ so noticeably in size of both incisiform teeth and cheek teeth from the eleven specimens of *Rupicapra rupicapra* with which I have compared them that there seems to be no reason to doubt that they represent a peculiar local form. This may be known as:

Rupicapra fæsula sp. nov.

Type.—Adult male (skin and skull) No. 174,943 U. S. National Museum. Passo Mandrioli, headwaters of the Savio River, Florence, Italy, September, 1911.

Diagnosis.—Similar to *Rupicapra rupicapra* (Linnæus), but teeth noticeably larger, the length of maxillary row 62–64 mm. instead of 56.6 to 59 mm., that of mandibular row 64 to 68 mm. instead of 57 to 61.4 mm.

Measurements.—Type (m^3 moderately worn): Head and body, 1330; tail, 40; hind foot, 340; ear from crown, 115; condylobasal length of skull, 190.4 (197)*; zygomatic breadth, 85.4 (84.2); greatest breadth across orbits, 105.6 (107.4); mastoid breadth, 56.6 (58.0); nasal, 61.0

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* Measurements in parenthesis are those of a male with m^3 slightly worn.

(66.0); greatest breadth of both nasals together, 23.6 (20.6); mandible, 159.4 (162.0); maxillary toothrow, 62.2 (64.0); mandibular toothrow, 64.0 (68.0).

Remarks.—The differences in size are clearly shown both by the actual measurements of the individual teeth, and by the area of the crown considered as a parallelogram. In the following table the teeth of the two specimens of ***Rupicapra fæsula*** are compared with those of three adult males of ***R. rupicapra*** (the largest in the collection) and an adult male of ***R. pyrenaica***.

Rupicapra fæsula.

Number.	m^1.	m^2.	Upper premolars.
174943	13.0×10.4=135.2	14.6×10.4=151.8	25.2
174957	13.2× 9.4=124.1	14.2× 9.8=139.1	24.8
Number.	m$_1$.	m$_2$.	Lower premolars.
174943	11.2×6.6=73.9	13.4×6.8=91.1	20.0
174957	11.8×6.4=75.5	14.8×6.2=91.8	22.6

Rupicapra rupicapra.

Number.	m^1.	m^2.	Upper premolars.
882	12.4× 8.6=106.6	12.6× 8.6=108.4	22.6
4360	10.8×10.0=108.0	12.4×10.0=124.0	23.2
175016	12.0× 8.2=104.0	13.0× 8.0=104.0	23.6
Number.	m$_1$.	m$_2$.	Lower premolars.
882	10.8×6.0=64.8	13.0×5.6=72.8	19.4
4360	9.2×6.6=60.7	12.4×6.6=81.8	19±
175016	10.4×6.2=64.5	13.0×6.2=80.6	20.2

Rupicapra pyrenaica.

Number.	m^1.	m^2.	Upper premolars.
174607	12.0×8.0=96.0	13.0×8.2=106.6	21.6
Number.	m$_1$.	m$_2$.	Lower premolars.
174607	10.8×6.2=66.9	13.0×6.0=78.0	20.0

The teeth are relatively as well as actually larger than in ***Rupicapra rupicapra***. In two adult males of the former the ratio of upper toothrow to condylobasal length of skull is 29.1 and 30.5. In the two males of ***R.***

fæsula it is 32.1 and 32.5. The ratios of mandibular toothrow to length of mandible in the same specimens are: *R. rupicapra*, 37.7 and 37.9; *R. fæsula*, 40.1 and 41.3. In the incisiform teeth the same difference in size is evident on comparison though not easy to express by definite measurements.

In color *Rupicapra fæsula* closely agrees with *R. rupicapra*. Both specimens are in the short summer coat in which *R. ornata* is figured by Neumann. Neither shows the slightest tendency, as in *ornata* and *pyrenaica*, for the pale throat area to extend downward on the neck.

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NOTES ON THE SALAMANDERS OF THE NORTH CAROLINA MOUNTAINS WITH DESCRIPTIONS OF TWO NEW FORMS.

BY C. S. BRIMLEY.
Raleigh, N. C.

This paper is based on collections of salamanders made in various parts of the mountains of North Carolina, between the years 1902 and 1912, both inclusive, by F. Sherman, entomologist of the State Department of Agriculture, H. H. Brimley, curator of the State Museum, Z. P. Metcalf, professor of zoology and entomology, North Carolina A. and M. College, and myself.

The counties in which more or less collecting has been done by us are Buncombe, Cherokee, Haywood, Macon, Mitchell, Transylvania, Watauga, and Yancey, at elevations ranging from 2000 feet up to the tops of some of the highest mountains, 6500 feet elevation.

Besides our own records a few from other sources are added to round out and complete the list, the species not collected by us being marked with a star (*).

My thanks are due to Professor Metcalf for valuable help in drawing up the descriptions of the two new forms, as well as for the illustrations accompanying this paper, while Mr. Sherman is due especial credit for his zeal in collecting salamanders in past years.

FAMILY CRYPTOBRANCHIDÆ.

Cryptobranchus alleghaniensis Daudin.

HELLBENDER.

Found only in the streams belonging to the Mississippi drainage. Our records are from Pensacola, Yancey Co., Oct. 3, 1902; Cane River, Yancey Co., Oct. 2, 1902 (FS & HHB); and Andrews, Cherokee Co., May 13, 1908 (FS).

FAMILY AMBYSTOMIDÆ.

***Ambystoma jeffersonianum** Green.

JEFFERSON'S SALAMANDER.

"Very numerous under logs below the fir belt on Roan Mt., Mitchell Co." (Rhoads, Proc. Acad. Nat. Sc. Phil., 1895, p. 402.)

Ambystoma punctatum Linn.

SPOTTED SALAMANDER.

Andrews, Cherokee Co., May 13, 1908, two small specimens (CSB).

***Ambystoma talpoideum** Holbr.

MOLE SALAMANDER.

"Abundant in the high valley in northwestern North Carolina, in which the French Broad River takes its origin from mountain streams." (Cope, Batrachia of North America, 1889, p. 53.)

FAMILY SALAMANDRIDÆ.

Diemyctylus viridescens Raf.

AMERICAN NEWT.

Taken at Blantyre, Transylvania Co., Highlands, Macon Co., May, 1908 (FS & CSB); Grandfather Mt., Watauga Co., Sept. 11, 1908 (ZPM), and at Sunburst, Haywood Co., May, 1912 (CSB). The highest elevation of which we have record is 5000 feet on Grandfather Mt. According to my observations at Raleigh and in the mountains this species would appear to live in water only during the cooler portions of the year and to aestivate on land under dead logs and similar hiding places.

FAMILY PLETHODONTIDÆ.

***Desmognathus nigra** Green.

BLACK TRITON.

Not taken by any of us. Rhoads records two adults from Roan Mt. (Proc. Acad. Nat. Sc. Phil., 1895, p. 400), and Moore calls it abundant in the vicinity of Grandfather Mt. (Proc. Acad. Nat. Sc. Phil., 1899, pp. 316–323), but we are inclined to think the latter record is a mistake as Sherman, Metcalf and H. H. Brimley have all collected salamanders in numbers on Grandfather, but have never taken this species, hence we think Dr. Moore mistook the large dark-bellied specimens of *D. quadrimaculatus* for this species.

Desmognathus ochrophaea Cope.

ROUND-TAILED TRITON.

Abundant throughout the regions collected in, particularly at the higher elevations. Mostly found in water, but to some extent under logs. Over thirty taken from one spring near the summit of Mount Mitchell, at an elevation of 6500 feet, by Sherman and H. H. Brimley on Oct. 2, 1902. Other localities are Bald and Sampson Mts. and Cane River, Yancey Co.; Blantyre, Transylvania Co.; Highlands, Wayah Bald Mt., and Aquone, Macon Co.; Sunburst, Haywood Co.; and Grandfather Mt. It does not seem to range much below 3000 feet. Two specimens having a yellow patch on each side of the neck were taken at Highlands and on Wayah Bald Mt. in May, 1908.

Desmognathus quadrimaculatus Holbr.

MOUNTAIN TRITON.

Abundant; the most characteristic salamander of the rocky mountain streams, swimming and burrowing with great strength and agility among the loose stones or debris lying in the beds of the little streamlets. Old and large specimens are black-bellied, while younger and smaller ones are light colored below and much resemble *D. fusca*, except in size. The larvae attain a much larger size than those of *D. fusca*. Collected in numbers on Grandfather Mt. and at Blantyre, Cane River, and Sunburst, and in less numbers, but still common, at various points in Yancey Co., and at Highlands, Wayah Bald, and Aquone, Macon Co.; Andrews, and Joanna Bald, Cherokee Co.; Spruce Pine, Mitchell Co.; and Weaverville, Buncombe Co. This species is not uncommon at least as far down as 2,000 feet.

***Leurognathus marmoratus** Moore.

MOORE'S TRITON.

Three taken in pool in stream on south side of Grandfather Mt. in July, 1898 (see Moore, Proc. Acad. Nat. Sc. Phil., 1899, pp. 316–323).

The types, taken by Dr. J. Percy Moore, are the only specimens of this species known to have been taken anywhere so far as I know. Apparently our first specimens of *Desmognathus quadrimaculatus* came from the very same pool in which Dr. Moore got his types, and in that case one small pool has provided a new species and furnished also specimens to resurrect an old one.

Plethodon erythronotus Green.

RED-BACKED SALAMANDER.

Taken by Rhoads on Roan Mt., and by myself at Andrews, in Cherokee Co., May, 1908, the last specimens at an elevation of about 2000 feet.

Plethodon glutinosus Green.

VISCID SALAMANDER.

Common up to about 3000 or 3500 feet elevation, above which it seems to be wholly replaced by other forms. Taken more or less commonly at Blantyre, 2200 feet; at Sunburst, Haywood Co., up to about 3300 or 3500 feet; at Cane River, and at Andrews, 2000 feet. Two specimens were taken on Grandfather Mt. by Metcalf, but particular elevation not noted.

Two specimens, a small one and a good sized adult, taken by Sherman between Blowing Rock, Watauga Co., and Linville, Mitchell Co., are worthy of mention. In life they were of the usual color, but had a broad chestnut band down the back as in *P. erythronotus*. This, however, disappeared after the specimens had been placed in preserving fluid, and Dr. Stejneger, to whom I sent them, could not see that they differed from average southern specimens of this species. I presented them, with Mr. Sherman's consent, to the U. S. National Museum. Whether this curious occurrence has any bearing on the next species remains to be seen.

Plethodon shermani Stejn.

RED-LEGGED SALAMANDER.

The type specimen is recorded as having been taken "on Nantahala Mt., between Andrews and Aquone." The only other specimens that are known to have been taken anywhere were secured by Sherman and myself when traveling from Franklin to Aquone, over the Wayah Bald Mt., in May, 1908. We were on the Franklin side of the gap, but not very far from it, when Mr. Sherman remarked that he believed this was the very spot where he had originally taken the species, and sure enough right there, under logs near a little stream, we got six more specimens, all with brick-red legs. While travelling a little later from Aquone to Andrews, we looked for suitable localities, but found none nor did we get any more specimens, and Mr. Sherman is now of the opinion that he made a mistake in giving the locality of the type as "between Aquone and Andrews," and that it was actually where we collected the additional specimens in May, 1908. The type was collected by Mr. Sherman in August, 1904.

Plethodon metcalfi sp. nov.

UNSPOTTED SALAMANDER.

Description.—Bluish plumbeous above, pale grayish below, the two colors meeting somewhat abruptly on the median line of the sides. Under a lens the pale color of the lower parts is seen to be formed by the obliteration of the dark borders of the minute pale dots which are sprinkled over the whole surface of this species, *P. glutinosus* and *P. shermani,* so that the underparts consist of an irregular scattering of dark dots on a pale ground. Throat wholly pale, unmarked. From *P. glutinosus* this species is distinguished by the entire absence of whitish spots on the back, sides and throat, by the paler underparts, and smaller average size. From *P. shermani* it differs by having the parasphenoid teeth in a single patch divided only by a groove down the center, instead of in two patches, and by having legs colored like the neighboring portions of the body, instead of brick red in sharp contrast. The absence of color markings distinguishes it also from *P. jordani* and *P. aeneus.* In dental characters it agrees fairly well with *P. glutinosus*, having from four to ten teeth on either side in the vomero-palatine series, which are shaped about as in that species. The parasphenoids as mentioned above are about as in *glutinosus*, but the teeth are smaller and shorter. Costal furrows 14. Tail measured from hind edge of vent, about one-half of total length, slightly shorter in some, and slightly longer in other specimens. The largest specimen measures 140 mm., tail 72, the type is 112 mm., tail 52.

Described from thirty-nine specimens, twenty-two of them taken near Sunburst, Haywood Co., N. C., in late May, 1912, at elevations of about 3500 to 4000 feet, by Mr. Sherman and myself; the other seventeen

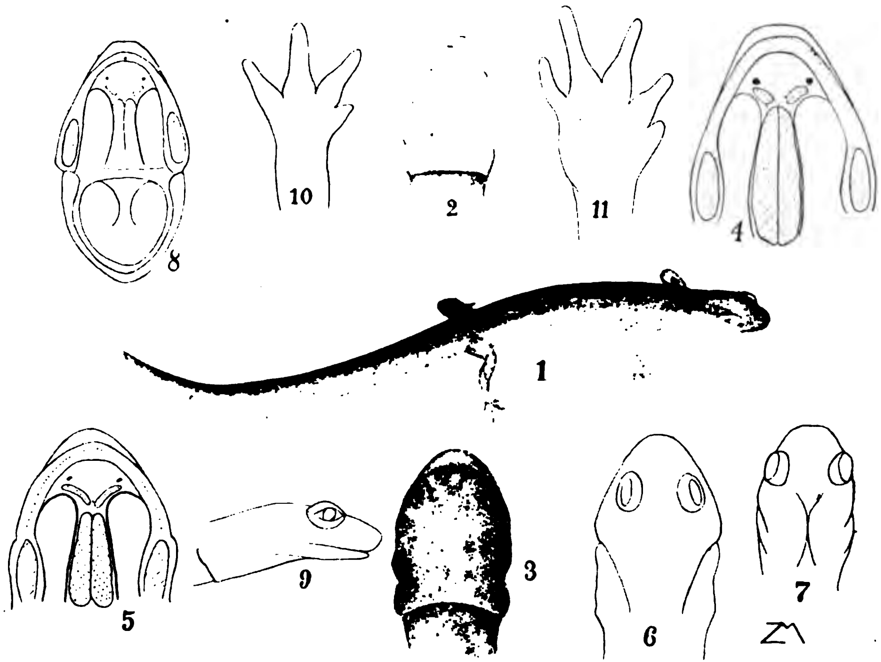

FIG. 1. *Plethodon metcalfi* sp. nov., dorso-lateral view, three-fourths natural size.
FIG. 2. *P. metcalfi*, ventral view of throat. x1½.
FIG. 3. *P. glutinosus*, ventral view of throat. x1½.
FIG. 4. *P. metcalfi*, teeth. x3.
FIG. 5. *P. glutinosus*, teeth. x3.
FIG. 6. *P. glutinosus*, dorsal view of head. x1½.
FIG. 7. *P. metcalfi*, dorsal view of head. x1½.
FIG. 8. *P. metcalfi*, tongue and roof of mouth. x2.3.
FIG. 9. *P. metcalfi*, lateral view of head. x2.3.
FIG. 10. *P. metcalfi*, fore foot. x3.
FIG. 11. *P. metcalfi*, hind foot. x3.

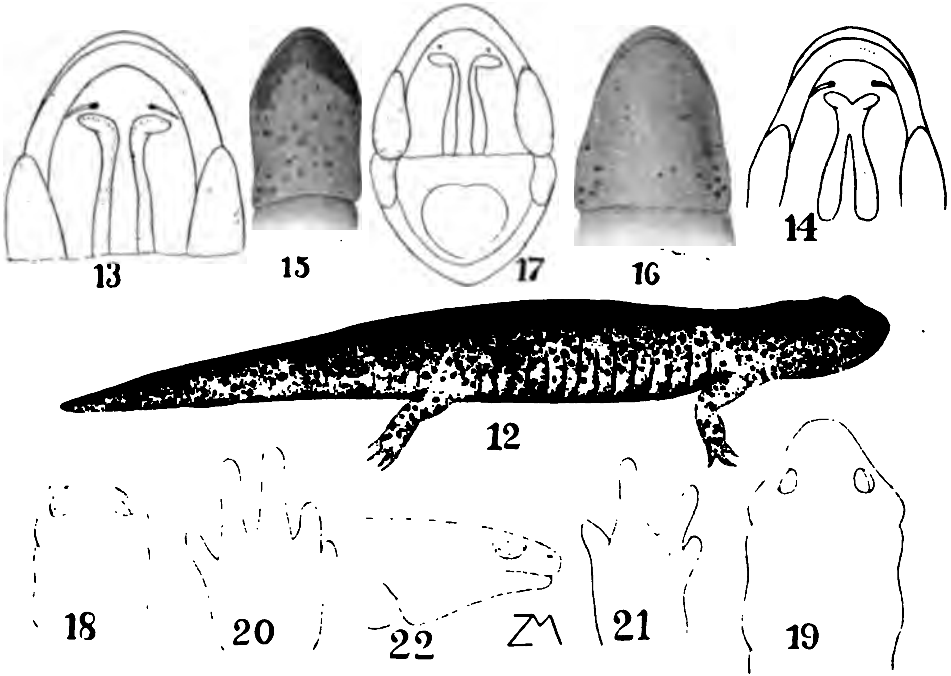

FIG. 12. *Spelerpes ruber schencki* sub. sp. nov., dorso-lateral view. Natural size.
FIG. 13. *S. ruber schencki*, teeth. x2.7.
FIG. 14. *S. ruber ruber*, teeth. x2.
FIG. 15. *S. ruber schencki*, ventral view of throat. x1.4.
FIG. 16. *S. ruber ruber*, ventral view of throat. x1.4.
FIG. 17. *S. ruber schencki*, tongue and roof of mouth. x2.
FIG. 18. *S. ruber schencki*, dorsal view of head. x1.4.
FIG. 19. *S. ruber ruber*, dorsal view of head. x1.4.
FIG. 20. *S. ruber schencki*, hind foot. x1.4.
FIG. 21. *S. ruber schencki*, fore foot. x1.4.
FIG. 22. *S. ruber schencki*, lateral view of head. x1.4.

collected by Mr. Z. P. Metcalf, on Grandfather Mt., in September, 1908, at an elevation of about 5000 feet. To this form are also ascribed two specimens taken at Highlands, Macon Co., 3500 feet, in May, 1908, and another taken on the Tuskwitty Range, 3500 feet, between Aquone and Andrews, a day or two later by Sherman and myself. These last three are not now in my possession, but so far as I remember they were exactly like the other thirty-nine.

The type specimen, Brimley No. 6766, collected at Sunburst as above stated, will be deposited in the U. S. National Museum.

Habitat.—Mountains of North Carolina, about 3500 feet.

Named after Mr. Z. P. Metcalf, who first collected the species in any numbers.

Spelerpes bilineatus Green.

STRIPED SALAMANDER

Generally distributed throughout the mountains, having been taken by us at Cane River, Yancey Co.; Mt. Mitchell, elevation 6500 feet; Grandfather Mt., up to 5000 feet, and at Blantyre, Toxoway, Highlands, Andrews, Weaverville, Sunburst and Black Mt.

Spelerpes guttolineatus Holbr.

HOLBROOK'S TRITON.

Taken at Andrews, elevation 2000 feet, and also sent us from Weaverville, in Buncombe Co. Cope records it from the upper valley of the French Broad River (Cope, Batrachia of North America, p. 172). This is an austral species not ranging above the lower mountain valleys.

Spelerpes ruber schencki sp. nov.

BLACK-LIPPED TRITON.

Generally similar to *S. ruber*, but differing in brighter coloration and in having the black spots on the back numerous, never coalescing to any extent, and never obscured nor overlaid with purplish brown. General color orange red, brightest on back, and a little paler on belly; back with numerous small round black spots, these varying in size, but never obscured by the color of the back. Throat with scattering black spots, those on the lower lips fusing so that the lips are almost wholly black. Parasphenoid series well separated from each, not closely approximated in front as in Raleigh specimens of *ruber*. The specimens so far taken are smaller than large *ruber*, not exceeding 120 mm. in length. Length of type, 108; tail, 31. Costal folds, 15. Apparently more terrestrial than *ruber*, as all the specimens were taken under logs and none in water. Type, Brimley No. 6789, taken at Sunburst, at an elevation of 3200 feet will be deposited in U. S. National Museum. Described from 9 specimens, 8 from Sunburst, 1 from Highlands.

This form which I name after Dr. C. A. Schenck, Director of the Biltmore Forest School, has been taken at Sunburst, Haywood Co. (8 specimens); Highlands, Macon Co. (3 sp.); Blantyre, Transylvania Co. (4 sp.). Specimens from Andrews were noted by me at the time as agreeing with the Blantyre and Highlands specimens, but are not now in my possession. Two specimens one each from Burnsville, and Cane River in Yancey Co., agree in general color and in the separation of the parasphenoid series, but lack the black lips of *schencki*, and may be looked upon as intermediates between this and *ruber*. No true *ruber* have been taken in the same localities as *schencki*, and I look upon *schencki* as a geographical race of the former.

Spelerpes danielsi Blatchley.

DANIELS TRITON.

Cane River, Sept. 25, 1902, one taken by Sherman and H. H. Brimley under a log lying in water. Five taken at Blantyre in May, 1908, and two at Sunburst in May, 1912, by myself.

This rare salamander is red in life with black spots, but somewhat paler in color than *ruber*. It has a more serpentine motion in life than most salamanders, and seems to be wholly aquatic and of somewhat mud-burrowing habits. The vomero-palatine series curve forward and meet the parasphenoid series at an acute angle, while in *ruber* they curve backward and meet the latter at an obtuse angle. So far we have not taken this species above 3500 feet, nor below 2500 feet, and only in places where the bed of the stream is somewhat boggy in character.

Gyrinophilus porphyriticus Green.

PURPLISH SALAMANDER.

Rhoads records one from Roan Mt. (Proc. Acad. Nat. Sci. Phil., 1895, p. 401). Our only record is of three large larval salamanders (total length, 115 mm.), taken by Sherman on Black Mt. in May, 1911, which we were not able to place, but which Dr. Stejneger said were probably second year larvae of this species.

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PROCEEDINGS
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NATURAL HISTORY NOTES ON SOME BEAUFORT, N. C., FISHES, 1910-11.

No. I. Elasmobranchii—with Special Reference to Utero-gestation.

BY E. W. GUDGER.

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The personal observations recorded in this paper were made between May 25 and July 28, 1910, and between May 13 and July 15, 1911, while the writer was at work as investigator for the United States Bureau of Fisheries at its laboratory at Beaufort, N. C. The fishes studied were in part collected by the seining crew temporarily employed for the writer's work on the gaff-topsail catfish, but the larger number, especially of the rays, was obtained by visiting the drag-net fishermen up Newport River, and particularly Messrs. J. E. Lewis and Charles L. Willis of Morehead City, whose continued kindness it is a pleasure to acknowledge.

The observations recorded other than the writer's own are chiefly those of Mr. Russell J. Coles, a sportsman of Danville, Va., whose fishing experiences at and about Beaufort and whose gifts of specimens to the laboratory cover nearly a decade. In another paper of this series more definite mention and acknowledgment of Mr. Coles' collections will be made.

Carcharhinus (species unknown).

On July 12, 1910, two small sharp-nosed sharks were taken at the Narrows of Newport River. On attempting to classify them it was clear that while they plainly belonged to the genus *Carcharhinus*, it was equally clear that as to species they were neither *obscurus* nor *milberti*, the forms heretofore reported from Beaufort. Director Aller, to whom the classification was referred, thought it a matter either of immaturity or of variation, since he finds that Beaufort sharks rarely correspond in all details with the diagnoses given in Jordan and Evermann's Fishes of North and Middle America or in Smith's Fishes of North Carolina.

Mr. Peter Okkelberg, of the University of Michigan, while dissecting one of these sharks, called attention to the apparent absence of the spiral valve from the large intestine. On opening the other shark, the same condition was found. Director Aller, however, pointed out certain obscure twists in the wall of the intestine which he thought represented such, and later called attention to the following statement in Parker and Haswell, Vol. II (1897), page 164: "A spiral valve is always present in the large intestine (of the Elasmobranchii), though its arrangement varies considerably in the various families. In some cases (e. g. *Carcharias*) the fold is not a spiral one, but, attached by one edge in a nearly longitudinal line to the intestinal wall, is rolled up in the shape of a scroll."

Earlier in the season of 1910 the writer had the following interesting experience with a sharp-nosed shark some three miles up Newport River. He had visited some fishermen just as they were finishing clearing their net. They had thrown into his rowboat some female rays and a few small sharks. The former were autopsied for eggs and embryos and thrown overboard, and then a pair of jaws from one of the sharks was cut out and cleaned off. The fragments of this fish were likewise thrown overboard and presently the bloody water was bailed out and the boat washed. All this was done on a falling tide in a locality well known for sharks and rays.

Presently the dorsal fin of a large shark could be seen coming against the ebb tide. Standing in the stern of the skiff, the writer watched the shark "nosing around" in the water like a bird dog working a field for quail. Having arrived within 10 feet of the boat, it suddenly saw him for the first time, backed water in a perfect panic and disappeared in a flurry of mud and sand. Its length was about 8 feet, and from its large girth it was probably a *Carcharhinus* rather than a *Scoliodon*. This incident illustrates both the voracity and the cowardliness of this scavenger of the sea.

It may be noted in passing that during the summer of 1911 a number of sharp-nosed sharks were taken in the laboratory pound net and seine. Only the smallest of these, a male *Scoliodon terra-novae* 43 inches long, was identified. The others, ranging from 6 to 7½ feet in length, were taken from 3 to 7 miles from the laboratory, and because of their size, the smallness of the boat, and the fact that the seining crew was generally out on all-day trips, could not be brought to the laboratory for identification. Since *Scoliodon* rarely grows so large it is quite probable that these were *Carcharhinus*.

The largest shark taken at Beaufort in 1911 was brought in by some menhaden fishermen before the writer arrived at the laboratory. Capt. Oscar Noe, superintendent of the menhaden fish factory to which it was brought, reported that he found it to be 13½ feet over all. There can be no doubt that it was a *Carcharhinus*.

Squalus acanthias Linnaeus.

PICKED DOG-FISH.

On May 23, 1907, Director Aller obtained from a fisherman an adult specimen of this small shark. He noted, several hours after death, that there were about 44 spots arranged in two rows on the upper part of the body. This specimen was a female (length was not noted) and when cut open 3 young were obtained. This negatives the statement made by Jordan and Evermann (1896) that all of the Squalidae are oviparous.

This specimen, taken in Beaufort harbor, is the first recorded from North Carolina. However, Coles took two with hook and line at Cape Lookout in 1910, but saw none in 1911. The local name for this fish is *Bone-shark* in allusion to its dorsal spine.

Sphyrna tiburo Linnaeus.

BONNET-HEAD.

The best find made by the writer in 1911 was a female bonnet-head shark taken at the Straits about 7 miles east of Beaufort, on June 30, 1911. This fish measured 50 inches over all, and was 7⅛ inches between the eyes. The spread of her pectorals was 18 inches, the horizontal gape (width) of her jaws 3¾ and the vertical gape 3⅛ inches.

The two bilateral oviducts were in the usual position and were united behind in a short tube opening into the cloaca. Slightly back of the shell gland, each oviduct was enlarged to form a uterus 8 or 9 inches long and 1⅛ or 2 inches in diameter, slightly larger at the anterior end. Each uterus contained 5 eggs, 4 of which had on them embryos measuring about 50 mm. long, the egg nearest the posterior end in each vessel being infertile.

The exterior wall of the uterus was firm, tough, and muscular. The lining mucous membrane was very crinkled, folded, and plaited. Between the two was a layer of connective tissue so loose in its arrangement as to resemble a mass of fluffy cotton. One purpose of these structures is evidently to allow for the expansion necessitated by the growth of the embryos.

The embryos were about 50 mm. long and quite well developed. Protruding from the gill-slits were large bunches of long external gill filaments measuring 15 to 18 mm. The embryos were attached to the flat oily yokes by umbilical cords some 45–50 mm. long. These latter were thickly beset with what Alcock (1890), in describing the allied *Zygæna blochii*, the Indian hammer-head shark, calls "appendicula," like the tube feet of echinoderms.

The eggs lay separate from each other in spindle-shaped depressions or compartments. Each egg was enclosed in a shell composed of very thin but tough and elastic material highly iridescent in appearance and curiously crinkled and plaited at the ends. In all respects they were very like those previously reported for the butterfly ray, *Pteroplatea maclura* (Gudger, 1910). The compartments were similar to those described by Alcock (1890) for *Carcharias melanopterus*, and the other structures were almost identical with those found by the same author in *Zygæna blochii* above referred to. It is the intention of the writer to give later a fuller description of these structures with illustrations.*

In 1902 Mr. Coles brought to the laboratory at Beaufort a female bonnet-head 6 ft. long from which 8 young were obtained. The writer had the good fortune to be present on that occasion and to assist in the dissection.

Pristis pectinatus Latham.

SAW-FISH.

The saw-fish has never, so far as the records show, been taken in Beaufort harbor. It is however occasionally captured at Cape Lookout in deep drift nets used for catching Spanish mackerel, *Scomberomorus maculatus*. It is a bottom-living fish and is generally found entangled in the lower part of the net. The fishermen dread it very much, partly because of its size and activity, but more because when thoroughly entangled in their nets the only way to get rid of it is to cut out a part of the net and set the creature free. This is of course a very expensive procedure. If, however, only the "saw" is entangled, the fish is hauled alongside, a rope is made fast to the saw and when this is cut off the fish is turned loose.

In the summer of 1902, there was brought to the Beaufort laboratory a saw 37 inches long having 28 pairs of teeth. Reckoning the saw at about ¼ of the whole, the total length of this fish must have exceeded 12 feet.

In 1908 Coles took one at Cape Lookout 13 feet 10 inches long. Its saw had 26 teeth on the right and 25 on the left side. On another occasion Coles netted another fine specimen but was only able to save the saw which was nearly 4 feet long. A smaller saw in his possession is 34 inches long and has 24 teeth on the right and 26 on the left side. He reports that the length of the adult fish at Cape Lookout runs from 13 to 15 feet.

Dasyatis say (Le Sueur).

STING-RAY.

In 1910 a considerable number of *Dasyatis say* were obtained from the drag-net fishermen in Newport River. These rays, when in the bunt of the net, were generally speared with a beardless harpoon or pike and thrown into my skiff where they were for prudential reasons either deprived of their tails or knocked on the head with a long-handled hatchet provided for the purpose. The shock of these operations usually brought about delivery of the young, particularly if these were pretty far advanced. This took place in five separate cases.

Some of these young, thus brought into the world, were carried alive to the laboratory in buckets of water. Placed in running salt water they lived 10 hours. They moved around rather freely but had difficulty in staying right side up, lying for hours on their backs; nor did righting them better matters, for, if they attempted to swim about, they invariably came to rest with their ventral surfaces uppermost. One, however, when placed in the normal position on the bottom of the aquarium, showed, in the lifting of the body and in the motion of the hinder edges of the pectorals, the characteristic breathing movements of the adult.

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* A report on this shark was made by the writer at the meeting of the American Society of Zoologists in December, 1911. See Gudger, 1912.

In this connection it may be interesting to note that Waite (1901) writes that 7 young, removed by a Caesarian operation from a female *Hemiscillium modestum* Gthr. when put in a pool of water swam about freely, so also did 23 young excised from *Orectolobus barbatus*. Later, 19——, he quotes a writer in the "Sydney Mail" that the young of *Carcharias brachyurus* Gthr. when cut out and thrown into water swim about even with the yolk sac still attached. So Alcock (1890) states for the young of *Carcharias dussumieri*.

On June 17, 1910, two female *Dasyatis say* were taken in the same haul. One was 25 inches wide over the pectorals, and 25 inches long to the end of the ventrals; the width between eyes (outside edges) was 5¼ inches, between spiracles (inside measurement) 4½ inches, mouth (transverse) 2¼ inches. This ray gave birth to 4 young, 3 males and 1 female, all of a light brown color. Two were 12 inches long, one 12⅛ and the other 12⅜. All four were 5 inches wide. The three males had tails 7⅝ inches long. The female, which was also the longest bodied, had a tail measuring 7$\frac{15}{16}$ inches. One had the yolk sac and umbilical cord gone leaving a slight navel. Two had these reduced to mere warts, while those of the fourth were slightly larger.

The second ray measured 36 inches wide by 35 long, and was 62 inches from snout to end of tail. The outside measurement between eyes was 7 inches, the spiracles were 5⅜ inches apart, and the mouth was 3 inches wide. This very powerful fish, on being speared while in the bunt of the net, lashed out with her tail and drove the spine into the side of the boat where it was broken off.

Two young were obtained, but being absolute twins only one was brought in and measured. This was 14¾ inches long, 5¾ wide, with a 9½ inch tail. While considerably larger than the young of the first specimen, it was much younger, being practically devoid of color and having attached by an umbilical cord a yolk bag nearly an inch long. It would seem that the larger the mother the larger the young to which she gives birth.

The embryos taken were, except in one case, found bathed in a substance of the color and consistency of rich yellow Jersey cream. The exceptional case had the uterus filled with a clear yellowish watery fluid.

The older embryos had the large intestine filled with a chlorine-yellow substance, evidently the milk-like food secreted by the villi and taken in probably through the spiracles. Notwithstanding the fact that the umbilical cord entered the alimentary tract at the junction of the small with the large intestine, and that the material in the anterior part of the large intestine was lighter in color than that in the middle and hinder regions, it is reasonably sure that it was not yolk. In an embryo 12 inches long and 5 wide it equaled about 60 per cent of the volume of the yolk when the egg was in segmentation. Examined microscopically it appeared as a finely divided flocculent material grading from particles so small as to show the Brownian movement to large plate-like masses. The enormous increase in size of the young is proof indisputable that the young feed on the milk during the period of gestation. It is probably absorbed at first by the long external gill filaments, but as the young ray grows these disappear and the spiracles become functional and the "milk" is taken in by them. There can be no reasonable doubt that this is the manner in which the young of *Dasyatis say* and *Pteroplatea maclura* are nourished.

The following data were noted in 1910 in regard to the functioning of ovaries and uteri and their relation to each other in 8 specimens of *Dasyatis say*. Two had both uteri gravid with ovaries insignificant. One had both uteri empty and reduced but the left ovary full of fairly large eggs. Five had the left uterus only with young. Of these five, two had the right uterus almost indistinguishable. One of these two and one other of the five had the right ovary reduced to a mere shred. Not one had the right ovary with eggs of any size. Four of the eight had the left ovary with eggs approaching maturity, and three of these four had the left uterus only with young.

The summer of 1911 was marked by poor success in getting sting rays with embryos. Three were obtained with young approaching the hatching stage. One, 24 inches wide, had 3 young measuring 5¼ inches in width, 13 inches long (to end of tail), and 5–5½–5¾ inches from end of snout to end of ventral fins. The other measured 26 inches in width and bore four young. These were 6 inches wide, 6 inches long to end of ventrals, and 15 inches over all. The third, which measured 25½ inches between points of pectorals, gave up 3 young averaging 6¼ x 6¼ x 14¾ inches, the greatest variation in their measurements being ½ inch.

In addition to the above, 3 individuals were taken with eggs in early stages, but these were unfortunately lost. These fish were 23, 33, and 35 inches wide respectively. They were large, heavy, and active. In striking them with a hatchet to quiet them, and in throwing them from the bunt of the seine into the small boat in which they were dissected, the uteri were evacuated and the eggs thrown out into the bloody water. The yolks were in some cases recovered, but all the embryos were lost.

Sixteen non-breeding* females, ranging in width from 12 to 33 inches, had the left ovary from twice to three times the size of the right, while 13 breeding females, varying in width from 13 to 35 inches, had the left ovary functional and the left uterus greatly dilated, the corresponding organs on the right side showing no signs of fertility. Only 6 of these bore eggs or embryos as described above. One having early eggs showed by the condition of the ovary that ripe ova had left this organ but a short time previously. One of those with embryos nearly ready to be born had eggs measuring 12 to 15 mm. in diameter. Another had in the ovary 3 eggs measuring 17, 17, and 18 mm. in diameter. The left uterus of this fish was swollen and very villous. Another had in the left ovary 3 eggs,

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* That is with uteri showing no signs of enlargement.

17, 17½, 18 mm. in diameter respectively; the uterus on the same side was greatly swollen, and shaggy with villi. Two others had the left generative organs as above, although the eggs in the ovary were not quite so large, measuring from 12 to 15 mm. only.

In no right ovary did the writer, in 1911, find any large or even distinct eggs, and in no fish did he find a right uterus functional. In this connection it is pertinent to note that Haswell (1888) states that in *Urolophus testaceus* the left oviduct only is functional. Alcock bears like testimony of *Trygon bleekeri* (1892); " . . . in all the pregnant rays that I have since dissected, where only one oviduct is pregnant it is always the left."

From this data the following conclusions may be drawn. First, that *as a rule* the left ovary and left uterus only of *Dasyatis say* are functional. Secondly, that as the eggs ripen the uterus enlarges and becomes villous to receive them. Thirdly, that this ray may give birth to a second set of young each season.

During the season of 1911 the writer dissected a number of sting rays to determine their food. In all specimens in which digestion had not gone too far, this was found to consist of annelid worms of two kinds. The first of a small-sized red worm found everywhere. The other of a splendid large green worm. These rays are bottom feeders. Beaufort harbor and the surrounding waters are filled with hundreds of acres of sand and mud flats in which live millions of tubiculous worms. These thrust out their heads from the mouths of their tubes as the flood tide covers the sand flats and at this time the rays come in over the shoals to feed.

The following incident may be related as showing how early the defensive instinct manifests itself in this fish. On June 30, 1911, there was taken in a haul of the seine a young female ray 6¾ inches wide, 6½ long to end of ventrals, and 12 inches to the end of the tail. This was probably not more than a week, possibly not more than 2 or 3 days old. When first picked up it lashed out with its tail and struck the point of its sting in the writer's thumb, whereupon it was dropped into the boat. In order to ascertain whether this was a purposed action or accidental, it was again picked up, whereupon it again lashed out savagely with its tail. It is probable that one taken from the uterus at the time of parturition would do the same thing.

During 1911 there was taken by the writer a number of sting rays whose caudal appendages had suffered abbreviation. Among them was the young one above referred to. In addition 3 good-sized ones were taken which were tailless. A 12-inch wide female had the tail completely gone. An 18½-inch male had a stump one inch long. Lastly a 20-inch male had a 2-inch stump. For a possible explanation of how this condition in these rays has come about, the reader is referred to a previous paper by the writer (Gudger, 1907), in which it is shown that sting rays form no inconsiderable part of the food of the hammer-head shark, *Sphyrna zygæna*. It may be conjectured that a hammer-head had been chasing these rays. They lashed out with their tails and fixed their spines in its head or jaws, whereupon the shark incontinently bit the tails off.

Pteroplatea maclura (Le Sueur).

BUTTERFLY RAY.

In making observations and collecting data for a study of viviparity in the butterfly ray, the writer was so fortunate in 1910 as to get a good amount of embryonic material, in fact fully half the stages necessary for the life history. The most interesting of these is a young ray with the pectorals so far developed that they have coalesced with the head stalk, with long, filamentous gills projecting from the gill slits, and, what is most remarkable, with a tail nearly equal to the length of the body and having its hinder two-thirds expanded into a broad paddle-like fin.[*] When it is remembered that the adult ray has a very short and insignificant tail utterly devoid of any fin structures, the importance of this discovery in the phylogenetic history of the animal is apparent.

The writer's earliest collecting in 1910 was done on May 27. The uteri of the first ray caught on that day were both pregnant, one egg being found in each. These eggs each had a thin straw-colored transparent shell much crinkled and plaited (bellows-fashion) at the ends but not twisted as in the eggs noted in my paper for 1909. One end of each shell was long and clear, the other end short and crushed,—"telescoped" is the way the notes put it. One egg had a selachian embryo, the other an invaginating blastoderm.

Waite (1901, 1902) quotes letters from Haswell that the viviparous *Hemiscillium modestum* has around its egg a thin shell which is soon thrown off, and that *Galeus antarcticus* has chitinous bodies in the uterus consisting, as proved by chemical analysis, of the identical material as that composing the egg shell of *Cestracion* and of other viviparous Elasmobranchs. These bodies Haswell considers as several vestigial shells run together. Later, Waite (1909) took several female *Galeus australis*, of the family Carchariidae, in which were found numbers of young, each in a thin membranous envelope contained within the uteri. One female contained 34 young equally divided between the 2 uteri.[†] Parker and Haswell (1897) on p. 168 of Vol. II say: "In some of the viviparous forms (of Elasmobranchs) a distinct, though very delicate, shell, sometimes having rudiments of the filaments, is formed, and is thrown off in the uterus." The chalaza-like structures, seen by the present writer in 1909–'10–and '11, were in all probability these vestigial filaments. These structures have been described above for the bonnet-head shark also.

The uteri of every one of these rays, as in *Dasyatis say*, had the interior villous, and all save three were filled with milk. Two of these, opened as soon as the female was caught, were enormously distended with a clear liquid which showed no signs of milk, while the third, after being in formalin some hours, was found to have a buttery precipitate in a clear supernatant fluid. There can be but little doubt that the purpose of the long external gills is to absorb this "milk" and that after the disappearance of these gills this is taken in through the spiracles as Alcock (1901) conjectures for the congeneric *Pteroplatea micrura* of the Indian Ocean. Indeed on July 17, while handling the just-dead, advanced embryos of the butterfly ray, a considerable amount of flocculent material, *i. e.*, coagulated milk, was discharged from the mouths of two of them. These two young rays, when taken from the uteri, had their pectorals rolled up like those of the sting ray, but in reversed fashion, *i. e.*, ventrally.

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[*] See Gudger (1911) for an abstract of a report on this larva made before the N. C. Acad. Sci.

[†] See also Alcock (1901) as quoted in my Notes for 1909 (Gudger, 1910).

One of the large females referred to in a preceding paragraph had the tail gone from its point of junction with the ventrals. Calling the attention of my head fisherman to this, he remarked that it was rare to find a butterfly ray so mutilated. In this connection he added that in very large and old specimens of this ray occasional ones were found to have stings. In 1911 this statement was repeated by other fishermen, men like the former, in whom I have confidence. I have examined for such a spine nearly every large butterfly ray I have ever taken, but so far have never found any indication of one. Its occurrence must be rare. On this point Smith (1897) says "spine usually (always?) lacking."

All of the females taken in 1910 had embryos in each uterus. The two largest ones, 32 inches wide by 19 long and 30 inches wide by 18½ long, had in addition their left ovaries *only* filled with eggs from 5–10 mm. in diameter. These were taken July 16. From these facts the conclusion may be arrived at that the butterfly ray may give birth to two sets of young each season, and that if so the second set will probably be borne in the left uterus only. However, this matter needs further investigation. In the ovaries of these rays, as in those of *Dasyatis say*, the lumina were filled with an abundant yolky material which probably came from the breaking down of some of the ova. In all these ovaries, however, there were large eggs approaching maturity.

In my Notes for 1909* the fact is recorded that the young of the cow-nosed ray, *Rhinoptera bonasus*, come into the world rolled up like a piece of paper, one pectoral inside, and one out. The young of the common sting ray have the pectorals turned upward and rolled inward and downward toward the median line, like two hands placed wrists together, palms uppermost, fingers closed to touch palms. While in a preceding paragraph it is noted that the young of the butterfly ray are born with the pectorals held in reverse fashion, *i. e.*, turned downward and rolled inward. Hill (1862) has figured and described the young of the Jamaican *Cephaloptera massenoides*, a ray probably near to *Aodon hypostomus* or *Mobula ölfersi*, with pectorals folded on the dorsal surface, one overlapping the other. Earlier, however, than any of these writers, Galard de Terraube (1799)† described the young of a long-tailed ray of Guiana (name not given) as coming into the world rolled up like waffles (gauffres),—like the young cow-nosed ray. It seems that these differences find explanation in the supposition that the young rays in the uterus of the mother are able to change the position of their pectorals just as the young teleosts in the egg are able to shift their tails from right to left side of the egg or vice versa.

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* Gudger, 1910.

† Tableau de Cayenne ou de la Guiane Francaise, pp. 131–2.

During 1910 the writer noticed for the first time that the claspers of both the sting and butterfly rays have a kind of knuckle joint at the basal end and that they can be rotated on this joint until they point inward and forward, thus enabling the rays to lie belly to belly, heads forward, while in copulation. Further it was noticed that in the female genital opening there are two little pockets placed laterally, in which the claspers are evidently received. Later it was found that Agassiz (1871) had expressed the same idea some 40 years ago.

For some unknown reason comparatively few butterfly rays were taken at Beaufort by the fishermen during the writer's stay in the summer of 1911. The laboratory seining crew made a number of trips especially for them, but only one of breeding age was taken. This had both uteri enlarged and each contained an egg with a selachian embryo. Each egg was enclosed in a thin transparent yellowish shell with chalaza-like twisted terminals as reported in 1909. Curiously enough the end of each shell at the posterior part of the embryo was much larger and more noticeable.

Aetobatus narinari (Euphrasen).

SPOTTED STING RAY.

Three perfect specimens were obtained in 1910 and two of them studied while alive. On June 30, while up Newport River, two fishermen* caught and kindly gave me a specimen which measured: length of body to end of ventrals, 19 inches; tail only 33 inches; all over 49 inches; width over pectorals 28½ inches, between eyes 4 inches, between spiracles 2⅝ inches (both inside measurements); projection of snout from a line joining anterior roots of pectorals, this being also a line joining the anterior edges of the spiracles, 4 inches. This fish weighed 11½ pounds and had two spines, the anterior eqnal to the length of the base of the dorsal fin, the posterior only half so long.

When alive it had for its ground color a dark chestnut brown with spots of a rich yellow cream. The spots on the head were smaller than elsewhere, and in the posterior region showed a tendency to run together. In life no bands, as shown in Jordan and Evermann's figure,† could be found, but after death they showed up faintly and the spots showed a tendency to become white. Where the skin was exposed to the sun it turned a rich velvety black, the epidermis then peeled off, leaving the ground color brown, and the spots turned blue.

The two other rays of this species were taken in the channel connecting the inner and outer harbors at Beaufort on July 4 and 7, 1910, and were presented to the writer by Messrs. Charles, John, and William Wheatley of Beaufort, to whom he is also indebted for specimens of other fishes.

The smaller of the two, a fine specimen, measured: length 18½ inches, tail only 39½ inches, all over 54¼ inches; width 27½ inches, between eyes 3¾ inches, spiracles 2½ inches (inside measurements); length of head from line joining front edge of pectorals and spiracles 4¾ inches, length of snout proper 2½ inches. The color was a chocolate brown with whitish spots.

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* Henry Congleton and John Harrell of Beaufort.

† Fishes of North and Middle America, Vol. IV, plate 15.

The larger specimen came into the writer's possession while yet alive and flapping on the beach, and the measurements and notes were made within an hour after its capture. Its body length was 26½ inches, tail only 27¾ (this had plainly been amputated in some way), all over 49½ inches; width 37 inches, between eyes 5 inches, between spiracles 3½ inches; longest diameter of spiracles 1¼ inches. It had three spines. Its weight was over 25 pounds, the limit of my little spring balance.

The general color of this fish was a dark chocolate brown with the spots of a cream color; some of these, however, turned a faint bluish-green after death. The spots were decidedly smaller on the head, and over each eye there was a row of three. Along the anterior edge of each pectoral they were arranged in a very definite succession, while on the scalloped posterior part of each fin there was a row of very small ones. In the posterior dorsal region a number were confluent, making dumb-bell shaped markings, and even in the spiracular openings small spots could be seen. There were no striations visible in this fish while fresh. The spiracles of this specimen, the largest the writer has seen, opened forward into the mouth and backward into the gill chambers, and communicated with each other. The spiracular valves swung backward and upward into recesses. The alimentary canal was full of clams without a trace of shell.

Abundant as have been the writer's opportunities for study of this interesting fish, those of Coles have been far more.* While fishing at Cape Lookout in July, 1909, he saw hundreds and killed 50. During the same month in 1910, at the same place, he says he probably saw 40 or 50 and collected 8. The largest captured was 5 feet 9 inches wide, 3 feet long, tail 5 feet 9 inches, total length 8 feet 9 inches, weight 132 pounds. In July, 1904, he captured a huge ray of this species which was not measured and could not be weighed, but which was estimated at 500 to 600 pounds.

In 1911 Coles found these rays very scarce at Cape Lookout, not more than a dozen being seen. This paucity, where he had before found them in considerable numbers, he thinks to be due to the scarcity of clams, their chosen and apparently only food. The largest caught weighed 90 pounds and was 5 feet wide, 2 feet 8 inches long, and had a tail 5 feet 6 inches in length. Another and gigantic specimen was harpooned, but, before it could be killed, it dragged the boat into the breakers where its struggles attracted a number of sharks which dismembered it before it could be secured. Its weight was estimated at 500 pounds or more.

In comparison with such giant specimens as these the writer's are plainly immature, only the last one being anywhere near grown. The opinion expressed in Notes for 1909 concerning the rarity of this fish at Beaufort needs some modification. It is rare in Beaufort waters, but not so much so as had been thought, Cole's observation for the open Atlantic at Cape Lookout, 12 miles away, to the contrary notwithstanding. Furthermore the bight at Cape Lookout, where his catches were made, forms a natural fish trap for all sorts of rare southern forms carried into it by the set of the Gulf Stream and the steady southerly winds. This is especially true of the shallow water fishes like the rays.

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*See Coles, 1910.

Before leaving this ray, it might be well to add that Mr. W. H. Shelton of Beaufort gave the writer the tail of a very large spotted sting ray of which unfortunately no measurements had been made. The tail, of which it is plain that the hinder portion was lost by some accident, is 4 feet 3 inches long. It bears 4 spines, and the evidence is rather clear that another has been torn off. The only other caudal appendage of a spotted sting ray comparable to this is the 5-spined one taken at Guam, described and figured by Quoy and Gaimard (1824), and deposited in the Museum of Paris. This tail had also suffered amputation and the length of the abbreviated portion is not given, nor is the description of the ray at all full, the drawing having been lost, but on account of the unusual and extraordinary number of spines these authors call it *Raja quinqueaculata*.

Nothing definite was known about the mode of reproduction in this ray until Coles published his paper in 1910. He tells us that the young are born, that is, are expelled from the uterus, while the mother is engaged in leaping high above the water. This he witnessed twice. His observation definitely proves that it is viviparous, and we may confidently expect on later investigation to find the female rays with villous uteri as in the forms previously described.

Rhinoptera bonasus (Mitchill).

COW-NOSED RAY.

On July 16, 1910, the writer took three young rays of this species in one haul at the Narrows. One was a female 20½ inches wide, 13¼ from snout to end of ventrals, tail 17 inches, length over all 27 inches, weight 5 pounds. The second, a male, measured as follows: width 20½ inches, length 13, tail only 21½ inches, total length 33 inches. The third, likewise a male, was 19¼ inches over all. The first male had one spine, the second two, and both had very short sexual appendages.

Since the present writer has taken from the uterus of the mother young 13½ inches wide and 8½ long (Gudger, 1910), and Bleeker (1852) in the same manner obtained from a *Rhinoptera javanica* 2 young measuring 240‴ and 280‴ wide (20 and 20.3 inches), he is led to believe that these rays were certainly not older than two years, and possibly were born not earlier than 1909.

These observations also show conclusively that the cow-nosed ray is viviparous, like all the other Beaufort rays studied by the writer. Viviparity, however, is not effected by means of a yolk-bag placenta, but by milk secreted by the villous lining of the uterus.

Manta birostris (Walbaum).

DEVIL FISH.

This goliath of the ray order has been reported from Cape Lookout and for years Coles has kept a close watch for it, but has seen it only once.

In July, 1909, he saw one leap three times at a distance of less than 120 yards from his boat. He estimated its width at between 20 and 30 feet, and the distance between the horns at 3–5 feet. This could hardly have been anything else than the great ray above named.

Smith (1907) says that it has been seen a number of times by fishermen at Cape Lookout. It is recorded among North Carolina fishes by several authors but has, it is believed, been seen only by the first of these, John Lawson (1714), whose interesting description is worthy of quotation here. "The Divel Fish lies at some of our Inlets, and, as near as I can describe him, is shaped like a Scate, or Stingray; only he has on his head a pair of very thick strong Horns, and is of a monstrous Size and Strength; for this Fish has been known to weigh a Sloop's anchor, and run with the vessel a league or two and bring her back against the Tide, to almost the same Place. Doubtless they may afford good Oil; but I have not experience of any Profits which may arise from them."

EGG-CASES OF UNKNOWN SELACHIANS.

It seems well to describe certain elasmobranch egg-cases or "purses" which come ashore on Fort Macon Beach in the lee of the first point south of the concrete breakwater.

First there is the ordinary egg-case known to all frequenters of our coast, and found very abundantly on the beach above mentioned. One of these dried cases of average size and appearance gave the following measurements: extreme length over (curled) tendrils $2\frac{7}{8}$ inches; length measured from center to center of curve between tendrils $1\frac{7}{8}$ inches; width of ends $\frac{13}{16}$ and 1 inch.

Some two years ago the writer found on the same collecting ground as the above a large egg-case. This, after being soaked and dried out as flat as possible, measured as follows: length stump to stump of horns (tendrils gone) $4\frac{7}{8}$ inches, from center to center of curve (as above) $4\frac{1}{4}$ inches; width at narrow end $1\frac{3}{4}$ inches, at wider $1\frac{7}{8}$ inches, of center $1\frac{3}{4}$ inches. This shell has probably lost $\frac{1}{4}$ inch in length by wrinkling.

In July, 1910, there was found another egg-case of like kind on the same collecting ground. This is so much wrinkled and shortened that it has lost from $\frac{1}{2}$ to $\frac{3}{4}$ inch in length, nor has it been possible to flatten it. However, it measures: length over all $3\frac{7}{8}$ inches, from center to center of curve $3\frac{7}{16}$ inches; width at narrow end $1\frac{3}{4}$ inches, at wide end 2 inches, across center $1\frac{7}{8}$ inches.

In 1911 another case similar to these was found lower down (*i. e.* south) on the same beach. Wetted and flattened out as much as possible it measures: length over all $5\frac{1}{4}$, from center to center of curved ends $4\frac{3}{4}$ inches; width at narrow end $1\frac{1}{2}$, at wide end $1\frac{3}{4}$, across center 2 inches.

On none of these cases is there trace of tendrils, these having been broken off short. The stumps, however, are hollow. The first shell is covered with an outer layer of horny material which readily splits up into coarse strands stretching from end to end. The second case has lost most of this covering, showing the polished chitinous shell. The third has hydroids attached to it.

These three large cases differ in yet another way from the small ones. The side pieces of the " barrow " in the small cases are of the same thickness and appearance throughout, being hardly distinguishable from the body walls of the shells. This is not the case in the large "purses." If the side bars be divided into $\frac{1}{4}$s, then the $\frac{1}{4}$ lying at each end is found to be no thicker than the back edge of an ordinary table knife, the middle $\frac{2}{4}$s however gradually thickens from each end toward the center, and in the region of the transverse diameter of the case is $\frac{1}{8}$ to $\frac{3}{16}$ of an inch thick. This is true for both side pieces for all three egg-cases. Each side piece is slightly concave from top to bottom (the shell being placed in a horizontal position) and has running lengthwise in its center a raphe or line of junction. Waite (1909) describes the egg-case of a carpet-shark, *Cephaloscyllium laticeps* Dum, in which the egg-case had similar lateral thickenings 3 mm. thick. However, what is probably the largest case ever found is referred to by Alcock (1901). It was dredged from 824 fathoms off the southern coast of India. This case was $6\frac{1}{2}$ inches long by $4\frac{3}{4}$ wide and contained an embryo too young for identification.

It is not known by what elasmobranchs these large Beaufort egg-cases are laid. The only selachians found in this part of the Atlantic which might have set free these shells are, so far as the writer knows, the Scylliorhinidae or cat sharks. These sharks are said to have large egg-cases with hollow tentacles, and the cases above described clearly fit this description. *Catulus retifer* has been taken off Cape Lookout, and *Scylliorhinus profundorum* off the mouth of Chesapeake Bay.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

NOTES ON THE MAMMALS OF MT. GREYLOCK, MASSACHUSETTS.

BY MANTON COPELAND.
BOWDOIN COLLEGE.

In company with Mr. Julius Rockwell of Taunton, Mass., I spent from August 27 to September 4, 1911, on Mt. Greylock, Mass., trapping small mammals. Some of the species captured proved to be of special interest, a fact which induced me to publish the following notes, briefly recording the results of our collecting, and presenting available data from other sources on the present mammalian life of the mountain.

Mt. Greylock, rising 3505 feet above the sea, is the highest peak in Massachusetts. Its faunal position is so clearly defined by Messrs. W. Faxon and R. Hoffmann in their "Birds of Berkshire County," I can not do better than quote from these authors. "Altitude has as marked an influence on the flora and fauna as latitude. It is this fact that gives Greylock its great interest in the eyes of naturalists. Rising as it does far above the surrounding country, it has the character of an island of northern vegetation—a bit of the Green Mountain thrust to the southward, just as the low, sterile plains of the southern Berkshire towns present the characteristics of Connecticut fields pushed northward. Greylock is clothed to the very summit with fairly tall trees, so that it lacks the Alpine aspect of extremely lofty mountain tops. Nevertheless, there has been found on the top of Greylock, on several occasions, a bird whose normal habitat is the edge of the tree line of the loftier northern mountains. This bird is the Bicknell's Thrush, found on Slide Mountain in the Catskills, and some of the higher peaks of the Adirondacks, the Green Mountains of Vermont, and the White

Mountains of New Hampshire—but nowhere else, as far as is known, in Massachusetts. Besides this interesting bird, a number of Canadian birds which occur only sparingly elsewhere in the county, are either common or abundant on Greylock. Such are the Winter Wren, Olive-sided Flycatcher, Mourning Warbler, and Brown Creeper."

The mountain has been visited by at least three mammalogists, and is the only locality in the State from which several species of Canadian mammals have been recorded. In May, 1893, Mr. Outram Bangs and Mr. G. S. Miller, Jr., spent a few days on the summit, and Mr. William Dearden made two trips there in 1907–1908, collecting mammals for the Springfield Museum of Natural History. Whenever specimens taken by them add to the value of the list the records are cited. Mr. George A. Bauer, superintendent of the Greylock State Reservation, who for several years has occupied the summit house, is a keen observer of the wild life of the mountain, and has kindly supplied me with notes on the occurrence of many of the larger mammals. He is the authority for all statements followed by his initials. Unfortunately it is impossible at this time to make the list complete, as information on certain species is somewhat meagre, and entirely lacking in respect to the bats. We did no trapping below about 2500 feet.

Much credit is due my companion, Mr. Julius Rockwell, whose indefatigable zeal in field work made possible the accomplishment of our purpose. I wish to express my thanks to Mr. Francis W. Rockwell, chairman of the Greylock Reservation Commission, for giving us permission to collect on the mountain, to Messrs. William Dearden and George A. Bauer for supplying me with notes, to Mr. Charles F. Batchelder for allowing me to examine the type of *Sorex dispar*, and to Dr. Glover M. Allen for comparing some of my specimens with those in the Museum of Comparative Zoölogy.

Odocoileus virginianus borealis.

Deer are commonly seen in open fields at about 2600 feet. They have appeared at the summit when driven by dogs. (G. A. B.)

Sciurus carolinensis leucotis.

Gray squirrels occur at the foot of the mountain but are rare above 1800 feet. They have been recorded rarely at the summit. (G. A. B.)

Sciurus hudsonicus loquax.

The chatter of the red squirrel was occasionally heard during our collecting trips in the more heavily timbered tracts several hundred feet below the summit. Their cone heaps were noted in favorable localities, and the species may be called rather common over the greater part of the mountain.

Tamias striatus lysteri.

The chipmunk appears to be more abundant than the last species, and its call was often heard a few hundred feet below the summit. A single specimen was taken in a mouse trap.

Marmota monax.

The woodchuck is common and universally distributed over the mountain. It was seen at about 2500 feet, and burrows noted several hundred feet higher, where one specimen was recently taken.

Sciuropterus sabrinus macrotis.

A flying squirrel was drowned in a rain barrel on the summit shortly before our visit, and I had the opportunity of examining its remains and saving the skull. It proved to be the Canadian species. Although a careful search for flying squirrels was made, no other examples were found.

Sciuropterus volans.

Mr. O. Bangs* records a single specimen of the southern flying squirrel.

Peromyscus maniculatus gracilis.

Only four examples of the Canadian deer mouse were positively identified, although a number of young, which were not preserved, may have been referable to this species. One of the former was brought in by the house cat at the summit house, and the other three were taken at "High Bridge" at an altitude of 2700 feet.

Mr. William Dearden reports having found it rather common on the summit, and Mr. Gerrit S. Miller, Jr.,† records four specimens taken May 8, 1893.

The Canadian white-footed mouse has not been taken elsewhere within the State.

Peromyscus leucopus noveboracensis.

This species of white-footed mouse is far more abundant than the preceding, and over thirty were trapped in various localities, principally on the summit.

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* Proc. Biol. Soc. Wash., Vol. 10, 1896, p. 166.

† Proc. Biol. Soc. Wash., Vol. 8, 1893, p. 69.

Evotomys gapperi ochraceus.

The red-backed mouse appears to be the most abundant of the small mammals, and nearly fifty were taken. It was secured in every station trapped where the conditions were at all favorable for its occurrence.

Microtus pennsylvanicus.

The meadow mouse seems to be rather uncommon, and only nine were secured. Their runways, however, were conspicuous within a limited area a few hundred feet below the summit, but judging from the results of our continued trapping the colony has recently undergone marked depletion.

Mr. William Dearden took about 14 specimens.

Microtus pinetorum scalopsoides.

One of the most interesting and certainly most inexplicable results of our collecting was the capture of seven examples of the northern pine mouse. A small colony was discovered on the very summit of the mountain, living in the many cavities which occurred beneath the spreading roots of the rather open growth of spruce and yellow birch. Six were taken here, three of which were about half grown. The other specimen, an adult, was trapped by a hole in the bank of the stream at "High Bridge," two miles and a half down the mountain. Near by were taken such northern species as the woodland jumping mouse and smoky shrew.

Dr. Glover M. Allen has kindly compared the series with specimens in the Museum of Comparative Zoölogy and finds them "quite typical of *scalopsoides*."

How this animal has wandered from its accustomed home and taken up its abode on a mountain top in the midst of Canadian environment, is a question difficult to answer. Springfield, Mass., and Lake George, N. Y., appear to be the nearest points to Mt. Greylock where the pine mouse has been found. It may, therefore, have followed some tributary of the Connecticut or Hudson Rivers, or worked northward through the valley of the Housatonic to the Berkshires. In all likelihood future collecting in western Massachusetts will reveal its presence more commonly than is now known.

Zapus hudsonius.

Only one example of the Hudson Bay jumping mouse was secured. It was taken on the edge of a small grassy clearing surrounding a pond a few rods from the spot where the first specimen of *Sorex dispar* was captured.

Napaeozapus insignis.

The woodland jumping mouse is common on Greylock, and no less than twenty-six were trapped. Three were captured in woods on the summit, but the greater number were found on the banks of a mountain stream which flows under "High Bridge." It has not been taken elsewhere in Massachusetts, although previously recorded from Greylock.

Erethizon dorsatum.

The porcupine is occasionally seen, principally at the summit. (G. A. B.)

Lepus americanus virginianus.

The varying hare is everywhere common. (G. A. B.)

Sylvilagus transitionalis.

The cottontail is common at the lower levels of the mountain, but seldom seen on the summit. (G. A. B.)

Lynx ruffus.

The tracks of the bay lynx are very rarely observed on the mountain. One was seen near "Jones Nose" (about 2700 feet) over four years ago. (G. A. B.)

Mr. William Dearden saw one on the Cheshire Harbor trail in July, 1908.

Vulpes fulvus.

The red fox is a common animal on the lower slopes of the mountain but is not seen above 2500 feet. (G. A. B.)

Mephitis putida.

The skunk occurs commonly down the mountain, and has been recorded once on the summit. (G. A. B.)

Lutreola vison.

Mink are to be found following the mountain streams but do not occur higher than about 2200 feet. (G. A. B.)

Putorius sp.

Weasels are rather common all over the mountain. (G. A. B.)

One was reported during our stay, and we learned that a "family" at one time occupied the summit near the barn. As we were unable to secure any, I can not state which species is the more abundant: *P. cicognanii* or *P. noveboracensis*.

Procyon lotor.

Although raccoons are never observed on the summit of the mountain, they occur rather frequently below. One was taken at "High Bridge" about three years ago. (G. A. B.)

Sorex personatus.

Seven long-tailed shrews of this species were taken on the summit, where it appeared to be the only representative of the group. One of these was captured by the house cat, which during our stay brought in no less than five species of mice and shrews. Mr. William Dearden also found this shrew inhabiting the summit, where he trapped about a dozen.

Sorex fumeus.

Five smoky shrews were taken at "High Bridge" by the edge of the stream along which woodland jumping mice occurred in abundance. A single specimen was caught in swampy woods, where *Sorex dispar* was found.

Mr. William Dearden secured two specimens on the summit. One of these, which is in the Museum of Natural History at Springfield, Mass., I have had the opportunity to examine through the kindness of the curator.

The examples here noted, constitute, I believe, the first records for the State.

Sorex dispar.

Two specimens of this rare shrew were obtained, the first recorded from New England. One was trapped under a rock at the edge of a moist grassy clearing, surrounded by woods, at an altitude of 3000 feet. A brook, which had been dammed to form a shallow pond, flowed through this little meadow, which was inhabited by several species of mice and shrews.

The second specimen was taken at a slightly lower altitude in swampy woods of spruce, hemlock and scattered birches thickly carpeted with sphagnum. A small brook ran through the woods, and near it the shrew was trapped in a runway beneath a log.

Both specimens agree perfectly with the type in the Batchelder collection.

Blarina brevicauda talpoides.

The short-tailed shrew is one of the most abundant mammals on the mountain, and twenty-five were taken. It was found in nearly every region trapped.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DEC 11 1912

DESCRIPTION OF A NEW *ANOLIS* FROM BRAZIL.

BY ALEXANDER G. RUTHVEN.
University of Michigan Museum of Natural History.

[Published with permission of the Director of the Museum of Comparative Zoology, Cambridge, Mass.]

A collection of reptiles recently secured for study from the Museum of Comparative Zoology contains a specimen of an apparently undescribed species of *Anolis* from Santarem, Brazil. I wish to dedicate this species to Charles Linden, in recognition of his excellent work as a collector in tropical America, where he was assistant to Prof. Louis Agassiz during his several years' exploring in Brazil on the famous Thayer Expedition.

Anolis lindeni sp. nov.

Diagnosis.—Size rather large. Tail rather strongly compressed to the distal third, with a trenchant dorsal ridge provided with a dorsal series of enlarged scales. Length of tibia equal to distance from end of snout to half way between eye and ear. Dorsal scales keeled, very small, becoming slightly larger on the median line, and grading into the minute laterals. Ventral scales smooth, much larger than the dorsals. Upper head scales smooth. Occipital scale large, as large as ear opening and larger than adjacent scales, separated from the supraorbital semicircles by a row of large scales. Scales of the supraorbital semicircles large and in contact medially. Digital expansions broad. A few slightly enlarged postanal scales and a moderately well developed gular pouch in the male. Color above, pale yellowish indistinctly marked with brown; a rather poorly defined stripe from eye to above ear.

Habitat.—Vicinity of Santarem, Brazil.

Type specimen.—Cat. No. 8306, Museum of Comparative Zoology; Santarem, Brazil; Charles Linden, collector.

Description of type specimen.--Male. Size large, total length, 145 mm.; tail length, 85 mm.; hind limb, 48 mm. The adpressed hind limb reaches to about the middle of the eye. Head about once and one-half as long as broad, longer than the tibia by about half the distance between the eye and ear. Upper head scales, except enlarged supraoculars, smooth, 9 and 10 enlarged and feebly keeled supraoculars. Scales of supraorbital semicircles enlarged, the semicircles in contact medially. Occipital scale large, as large as the ear, much larger than adjacent scales, and separated from the supraorbital semicircles by a row of large plates. Canthal scales 2; loreal scales in five rows, 8 upper labials and 7 and 8 lower labials; 2 mental scutes. Ear opening a rather small and nearly vertical oval. Body a little compressed, no dorsal crest. Gular appendage moderately large, scales smooth. Dorsal scales keeled, very small, becoming slightly larger on the median line and grading into the minute laterals. Ventral scales smooth, much larger than the dorsals. Digital expansions broad. Tail rather strongly compressed, and with a sharp ridge, for the proximal two-thirds of its length, distal third rounded. Sides of flattened portion with small obtusely keeled scales between single circumcaudal rings of larger, elongate, obtusely keeled scales; a row of enlarged keeled scales along the top of the crest and several rows on the ventral surface. Posteriorly the lateral caudal scales become larger and more sharply keeled and grade into the long, narrow, sharply keeled, and strongly imbricated scales that cover the rounded part. No decidedly enlarged postanal scales. The color can not be made out satisfactorily. The dorsal surfaces seem to have been yellowish ash, indistinctly marked with dark brown. The darker markings were evidently distinct only on the neck, temporal region and tail; they form a few elongated streaks on the neck, a poorly defined broad stripe from the eye to above the ear, and small spots on the top of the caudal ridge. Lower surfaces yellowish.

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PROCEEDINGS
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NATURAL HISTORY NOTES ON SOME BEAUFORT, N. C., FISHES, 1910–1911.

No. II. Teleostomi.

BY E. W. GUDGER.

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In the first paper of this series, printed on pages 141–156 of this volume, there were recorded the observations made during 1910 and 1911 on the Elasmobranchs of the region about Beaufort, N. C. The present paper deals with the teleost fishes and consists, like the first one, of notes on the personal observations of the writer together with data obtained from various other reliable sources.

Acknowledgment is gratefully made to Mr. Russell J. Coles and to the assistance received from Dr. Hugh M. Smith's "Fishes of North Carolina." The following notes, in many cases, only corroborate and extend the data presented so admirably by Dr. Smith.

Lepisosteus osseus (Linnaeus).

GAR-PIKE.

Two "shell gars" were taken by the writer during the summer of 1910, one of which was skinned. No measurements were made of the fresh fish, but the dried skin is 3 feet 5¾ inches long.

In seining at the Narrows during the latter part of May, 1911, the writer took no fewer than 10 gar pikes. The first of these, a female, was 42 inches long from tip of snout to tip of caudal fin, and 14⅛ inches in circumference. Autopsy showed the ovary, the right lobe of which was 10½, the left 11½ inches long, to be crowded with bluish-green eggs. The stomach contained 2 partly decomposed fish about 8 inches long. In skinning this fish it was found to be very fat, there being a large accumulation of this in what might be called the shoulder region.

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* Both the gars referred in "Notes for 1909" died during the winter of 1909–10. No record, however, was made of either time or cause. They were in captivity in the laboratory for more than a year, and probably for more than 15 months.

On June 6, 9 specimens were taken in one haul of the seine at the Narrows at Rockfish Rock. These measured over all: 26 inches (3 specimens), 27½, 35, 37, 37½ (2 specimens), and 44½ inches. Strong pressure brought neither eggs nor sperm from these fish, it being probably too early in the season—which it will be remembered had been a very cold and backward one.

The largest of these gars (a male), which was the largest the writer has ever seen at Beaufort, was thrown into the bottom of the fishing skiff and brought 7 miles to the laboratory. Being put in a tank of salt water it soon recovered and became quite normal. On the next day the water was drawn off that the fish might die, but as it refused to do so it was killed by having its throat cut. It may be remarked here that two or three gars were kept for a week in sea water of a density of about 1.023 without any apparent discomfort, in fact they seemed as much at home in this as in fresh water.

The following measurements were made of the large fish above referred to:

Length over all	44½ inches
Head to hinder edge of opercle	14 inches
Upper edge of caudal fin	4 inches
Lower edge of caudal fin	6 inches
Right lobe of testis	8 inches
Left lobe of testis	11 inches
Length of mouth	7½ inches
Vertical gape of mouth	5¼ inches
Diameter of orbit of eye	⅞ inch
Circumference of snout at end of lower jaw	1¾ inches
Snout at angle of jaw	6¼ inches
Head around eyes	8¼ inches
Head at hinder edge of opercle	10¼ inches
Body at front of pelvic fins	14 inches
Tail at front of base of caudal	6 inches
Spread of pectorals	9 inches

Anguilla chrisypa Rafinesque. (?)

FRESH-WATER EEL.

On June 15, 1911, while fishing with a dip net in a small brook at the Hammocks on the eastern side of Beaufort, 2 little eels were taken which at first were thought to be young Amphiumas. One got away but the other was safely brought to the laboratory where it was kept until it caused its own death by climbing over the edge of the aquarium. It was very long in the tail region, *i. e.* back of the anus. Its body was semi-transparent, so that when looked at from above its blood-red gills showed up prominently, and in lateral view not only these but the viscera could be seen. It was impossible on account of its very small size to count the fin rays, hence the doubt about its identification.

Bascanichthys scuticaris (Goode and Bean).

BLACK-SNAKE EEL.

In 1906, on July 31, Dr. H. E. Enders dug up, in a sandy shoal southwest from the laboratory and distant some 300 yards, a specimen of the black-snake eel, the first ever taken in the waters of North Carolina.

On July 10, 1911, one of the assistants dug up on the same shoal another but smaller specimen. Enders' specimen was brought in uninjured and kept for nearly three weeks before it finally died. The second specimen was cut nearly in two by the spade used in digging.

Enders' specimen was 89.2 cm. long, of which length the dorsal fin covered 86.5 cm., while the anal was 39 cm. long. The 1911 specimen was 40.3 cm. long over all. The dorsal was 38.5 cm. and the anal 17.5 cm. in length. The head from the tip of the snout to the hinder edge of the gill slits measured 2.2 cm., while the distance from the snout to the eye was .3 cm. The skin over the head was plaited in numerous very small longitudinal folds. The color above was greenish olive, below cream white.

Coles (1910) took a small specimen in a dip net at Cape Lookout in 1909. It was drifting near his boat when a small school of frigate mackerel came swimming by. Several of these snapped at the eel and mutilated its tail. The specimen is now in the museum at Beaufort.

Brevoortia tyrannus (Latrobe).

MENHADEN.

This fish was very scarce from May 25–July 31, 1910. During the latter part of May and the first of June a few small catches were made. On July 19 the wind changed from S. W. to W., N. W., N. and N. E. The latter wind brought a few schools of "fat-backs" into the harbor, the first one noticed being near the laboratory island on the afternoon of that day. Two days later one boat got a small load inside the harbor. Toward the close of September the fish reappeared in large numbers, and the most enormous catches in the history of Beaufort were made. The failure of this fishery during the early part of the season brought great hardship to the fishermen and to those who had invested in boats and gear for this work. In 1911 the fish, though not so scarce as in 1910, was by no means abundant in June and July.

Synodus foetens (Linnaeus).

LIZARD-FISH.

The lizard-fish is abundant in Beaufort Harbor, but rarely measures more than 8 or 10 inches. One, taken by some fishermen at the corner of Bird Shoal, near the inner beacon, on June 28, 1911, measured 13¼ inches over all. It is reported that specimens 2 feet long have been taken, but this is the largest which the writer has seen.

Coles (1910) reports these fish as fairly common at Cape Lookout, where they seem to be solitary in habit and are given to lying motionless in eel-grass, alongside a piece of timber, or half-buried in sand. He finds that they are voracious biters at the hook.

Tylosurus marinus (Walbaum).

GREEN GAR.

Tylosurus acus (Lacepede).

GAR-FISH.

On July 2, 1910, there was captured near the inner beacon in Beaufort Harbor a *Tylosurus marinus* 21½ inches long. Smith notes that the maximum size is about 4 feet, the average 1½ to 2 feet. On July 6 at the same place there was taken a *Tylosurus acus* 33 inches long. This was a female with an abdomen but 13½ inches long, through which stretched the alimentary canal, straight from mouth to anus. One horn of the ovary was rudimentary, measuring but ½ to ¾ inch, the other however was 9 inches long. The liver likewise had but one lobe. The air bladder was greatly dilated and was seemingly divided into compartments.

It is interesting to find that Sir Hans Sloane, as early as 1725, in describing the green gar-fish or needle-fish of Jamaica, *Acus vulgaris*, noted that "Its Stomach was in no ways to be distinguished from the Aesophagus or Guts, all three being one straight equally large tube from the Mouth to the Anus."

Mugil cephalus Linnaeus.

JUMPING MULLET.

The mullet is one of the most abundant and valuable fishes found at Beaufort. It is known to reach a length of 22 inches, but the 2 largest collected by the writer in 1911 were 13 inches long. One of these justified its name by jumping out of the bunt of the seine into the boat. Coles reports similar occurrences and says that once he received so hard a blow from one that he thought that his boatman had struck him with an oar.

Scomberomorus maculatus (Mitchill).

SPANISH MACKEREL.

Two fairly large Spanish mackerel were taken in the harbor in 1910, one of 2 pounds, the other of 3½ pounds weight and 25 inches long. Specimens taken outside the harbor frequently run to 9 or 10 pounds, while the maximum recorded for the Atlantic Coast, according to Dr. Smith (1907), is 41 inches long and 25 pounds weight. To illustrate the abundance of this elegant fish on our coast, it may be added that on October 17, 1910, Capt. J. H. Potter of Beaufort bought 3453 pounds of mackerel, which at 15 cents per pound amounted to $518. This catch was made at Cape Lookout by one crew of fishermen.

Trichiurus lepturus Linnaeus.

SCABBARD-FISH

During the summer of 1910 the writer again took at different times specimens of the scabbard-fish, *Trichiurus lepturus*, and at the same hauling ground as heretofore, viz., near the beacon opposite the mouth of Core Creek, about halfway between the laboratory and the Narrows of Newport River. The female was 27½ inches long and her ovary was filled with small eggs nearly ripe. The male lacked but 2 inches of being 3 feet long. Pressure readily brought the milky milt and under the microscope the sperms, which were active, were found to have a large head and middle piece and a long fine tail. The abdomen in this specimen measured 8 inches from the heart to the anus, of which space the enormously developed testis filled 7¼ inches.

Coles reports this fish as being very plentiful at Cape Lookout in 1909 and 1910, but that he saw none in 1911. In 1909 he took 50 at one haul. The writer recalls that on going to help fish the laboratory pound net one morning 5 or 6 years ago, the lead was found to have a dozen or more scabbard-fish meshed in it. It is far from uncommon at Beaufort in July and August.

Seriola zonata (Mitchill).

Seriola carolinensis (Holbrook).

RUDDER-FISH.

Of the rudder-fish, *Seriola zonata*, Smith (1907) says, in reference to its seeming infrequent occurrence,—"it will doubtless be found well represented on the North Carolina coast when properly sought." Until the present season (1911), the only specimen possessed by the laboratory was one measuring 3⅞ inches long. This was taken, June 18, 1904, in a trap under the laboratory wharf. The yellow bands so prominent in the living or newly dead fish have become dark and greatly faded through the action of the preserving fluid.

Of the closely allied form, *Seriola carolinensis*, Smith writes: "This species is closely related to *Seriola zonata* and has been regarded by recent writers as a variety of that species." As to its occurrence, it has been recorded from Beaufort by various authors, but Dr. Smith notes that it is far from common. The laboratory records give us the information that in 1902 the "Fishhawk" took one specimen, while in 1905 Capt. J. H. Potter sent a specimen to the museum. In 1910 Coles took at Cape Lookout a considerable number of *S. zonata* of various sizes, thus verifying Smith's prediction.

During the season of 1911 the laboratory pound net took several small *Seriola*, which were identified as *S. zonata*, and a larger one, classified as *S. carolinensis*, 10½ inches long to the root of the caudal fin, 13 inches over all, with a depth of 3 inches (the head alone was 3 inches long). The dorsal rays were V ÷ I + 35, the anal I + 19, while the bands were very marked. On June 16 two sportsmen fell in with a school off the Shackleford jetties and caught a score. Later in the season large numbers were taken by fishermen—the writer saw at one time on the floor of Capt. Potter's fish house some 300 or 400 pounds. The local name of this fish is "bream."

One of the young ones taken in the pound net was put in a large tank of running salt-water, and soon became the pet of the laboratory. At first the little fish, which was appropriately dubbed "Stripes," kept to itself, lying close against or swimming slowly around one of the legs of a wooden aquarium stand. Later, however, it became very friendly with three 12-inch salt-water catfish, *Galeichthys milberti*, which were kept in the same tank. These stayed for the most part under a low lying wooden stand which completely hid them from view. Here the little rudder-fish took up its abode, coming out to feed or to take a turn around the tank. Whenever the catfish swam around, the little fish swam just over one of of them in the pectoral or hinder dorsal region, seeming almost to rest on the catfish's back with its outspread pectorals. It did the same with a small green turtle. It was noticeable that if by any chance the little rudder-fish became separated from its siluroid companions, it swam about in all directions in almost a panic until it found them. When chopped bits of fish were thrown into the tank, the catfish never presumed to feed until their more sprightly companion had satisfied its appetite. All its actions gave the distinct impression of alertness and inquisitiveness. The writer has perhaps never had a more charming aquarium pet.

Selene vomer (Linnaeus).

MOON-FISH. LOOKDOWN.

It is a fact well known to all ichthyologists that the young of many fishes differ markedly from the adults. This is especially true of the moon-fish or lookdown. Of Beaufort specimens Smith (1907) says: "The young differs greatly from the adult in appearance, the body being much deeper, the profile less vertical, the ventral fins much longer, and the dorsal rays more produced. An example in the Beaufort Laboratory 1.25 inches long taken in the summer of 1900 has the ventral fins 1 inch long and the anterior dorsal rays 2.37 inches long."

On June 7, 1911, the writer took a specimen which measured in length 2 inches, in depth 1½, and which had anterior dorsal rays extending backward 3¾ inches. The body was faintly banded, the ventral fins were very long, as long as the anterior rays of the anal, and the chin region and breast parts met at an angle which lacked but little of making 70°. The bands, the exaggerated dorsal filaments, and the elongated ventrals made it look like the thread-fish, *Alectis ciliaris*; but the almost vertical forehead and a count of the fin rays forbade such identification. Finally by a process of elimination it was identified as *Selene vomer*. A greater difference between young and adult has never been met with among fishes by the writer.

Pomatomus saltatrix (Linnaeus).

BLUE-FISH.

One of the most toothsome of Beaufort fishes is the blue-fish, *Pomatomus saltatrix*. While caught in large numbers and of considerable size outside, those caught inside are of smaller size and are in fewer numbers. The laboratory seining crew took one in West Bay in Harker's Island on June 30, 1911, which was 21 inches long over all and 4¼ inches deep (body only). According to Smith the largest blue-fish ever recorded from the Atlantic coast was 3 feet 9 inches long and weighed 27 pounds. It was taken near Nantucket in 1903.

Coryphaena hippurus Linnaeus.

DOLPHIN.

The dolphin is such an infrequent visitor at Beaufort that the capture of a specimen is something of an event. According to Smith (1907) 4 specimens have been taken in the Beaufort region. For but one of these do we have definite data. On August 1, 1902, Mr. Charles S. Wallace, a fish-dealer of Morehead City, sent to the laboratory a fine specimen. It measured 28.5 inches from end of snout to tip of tail and had 56 dorsal and 27 anal fin rays. Its forehead was of the abrupt type common to its kind.

On June 7, 1911, Capt. J. H. Potter, a fish-dealer of Beaufort, presented to the laboratory a fine young specimen which had been taken at Cape Lookout. It measured 16 inches to the base of the caudal fin and 19 over all, and its depth was 3¼ inches. Its dorsal fin had 60 and its anal 27 rays. The profile of its head was not of the typically vertical shape but more pointed, in this respect agreeing with the small dolphin, *Coryphaena equisetis*, from which, however, it was excluded by the number of the fin rays. It was plainly a young *hippurus*, the adult of which is known to reach a length of 6 feet.

Coles reports that he has taken the dolphin by trolling in the breakers at Cape Lookout. Twice he has eaten of this fish and found it fairly good. His fishermen, however, refused to touch it, declaring that it was poisonous.

Lobotes surinamensis (Bloch).

TRIPLE-TAIL.

In "Notes for 1909" the writer recorded the length of some large triple-tails or flashers as 18½, 21, 23, 25, and 25 inches. Unfortunately there was no means at hand for weighing these specimens.

In 1910 the conditions were reversed, the two fine specimens caught being weighed but not measured.* One tipped the beam at 12 pounds, the other at 17½. The largest hitherto recorded for Beaufort weighed 11 pounds. The writer had no idea of the power of these fish until he attempted to catch and lift into the boat the larger of the above specimens. It not only spined him and broke away but deluged everybody in its flurries.

Coles relates that in 1909 he captured at Cape Lookout a "steamboat" (so called from its splashing habits when taken in a net) which weighed 26 pounds. However, large and powerful as were these fish, especially the last, they do not measure up to those found in the East Indies. Tenison-Woods (1888) captured on the north coast of Borneo a specimen nearly three feet long.

Archosargus probatocephalus (Walbaum).

SHEEPSHEAD.

On June 20, 1911, some fishermen on the outer side of Bird Shoal took a large specimen of this fish. It measured from tip of snout to tip of tail 17¼ inches, and in depth (body only) 6¾ inches. Unfortunately the writer had no means at hand for weighing this, the largest sheepshead he has ever seen.

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* These fish were taken by Capt. J. E. Lewis, of Morehead City, to whom the writer is indebted for many other interesting specimens.

Diplodus holbrookii (Bean).

SPOTTED-TAILED PIN-FISH.

Jordan and Gilbert reported this fish as very abundant in Beaufort waters in 1879, but not until the writer had hauled for several summers on the edges of the shoals with a small-meshed seine did he take any, and when caught they were thought to be new to Beaufort. During the summer of 1911 large schools of young were seen playing around the jetties on the inside of Shackleford Banks. In the clear water the spot at the bases of their caudal fins could be easily seen.

During various years since 1900, but always in July, Coles has taken the adult fish in great numbers at the "Rocks," about 2 miles out from New River Inlet. These were 12–13 inches in length and averaged about 1½ pounds in weight. He has often taken the young but never any adults at Cape Lookout. From this it would seem that New River Inlet is about the northern limit of adults.

Cynoscion regalis (Bloch and Schneider).

GRAY TROUT.

The largest gray trout, which the writer took during the summer of 1910 measured 18½ inches in length and weighed a full two pounds. However, toward the close of July, some menhaden fishermen made a catch of "fatbacks" near the railroad bridge at Beaufort, and got a number of trout running in weight from 2½ to 7 pounds. These of course were "outside" fish which had come in with the menhaden to feed on them.

According to Smith (1907), the average weight for this fish is about 2 pounds, though they frequently run 5 to 6 pounds, occasionally to twice as much, while the maximum recorded is 40 pounds.

Micropogon undulatus (Linnaeus).

CROAKER.

In all his seining around Beaufort the writer has never caught so many croakers, and these of such large size, as during 1910. In one haul at the Narrows, nearly a boat load of fish ranging from 9–12 inches were caught. Even the experienced fishermen expressed their surprise at both their size and abundance. The largest taken during this season were 14¾ and 15½ inches long. The latter weighed 1½ pounds. The largest taken in 1911 measured 12½ and 13 inches respectively.

Sciaenops ocellatus (Linnaeus).

RED DRUM.

During the summer of 1911 the writer collected 3 young red drum which were among the most beautiful fish he has ever seen at Beaufort. The first, taken June 23, in West Bay of Harker's Island opening on the

"Straits," was 17 inches long. After death the tip of the caudal became a fine cobalt blue working up toward purple as time passed. On the following day two others were taken in North River. One, measuring 17½ inches over all, had the black spots at the root of the tail as shown by Smith (1907) in plate 19, but lacked the lateral one. The other measured 25 inches and had 2 spots at the root of the caudal, but the lateral marking was on the right side just below and behind the junction of the spinous and soft parts of the dorsal.

Menticirrhus americanus (Linnaeus).

SEA MULLET.

The largest sea mullet, taken by the laboratory crew in 1910, measured 15¾ inches in length and weighed 2 pounds. These fish occasionally run to 3 pounds in weight but such specimens are rare. On June 20, 1911, Capt. Lewis took in Newport River two measuring 15½ inches each.

Pogonias chromis (Linnaeus).

SEA DRUM; BLACK DRUM.

Capt. Oscar Noe, superintendent of a menhaden fish factory at Beaufort, reports that about May 10, 1911, a menhaden boat in making a catch of that fish outside, took and brought in a great school of sea drum. These equalled 50,000 menhaden measure, *i. e.*, filled a great bin to the point that 50,000 menhaden would have done. Schools of these drum are often a great nuisance to the menhaden fishermen.

Ceratacanthus schoepfii (Walbaum).

FILE-FISH; FOOL-FISH.

On June 9, 1910, there was taken near the upper beacon in Newport River a large file-fish. Its length all over was 18 inches, the depth was 6⅞ inches, the greatest thickness 1½ inches, and its weight 1½ pounds. The ground color of this fish was a dirty cream and this was flecked over the whole body with bright orange. The anus measured 13/16 of an inch, a long narrow slit with its edges closely beset with granulations. A long bone extended on the ventral side from the throat region clear back to the middle of the belly. Under the forward end of this bone and between the bases of the pectoral arches, and completely separated from the belly cavity by these bones lay the heart in close juxtaposition to the gills. This heart was curiously elongated, measuring about one inch in length.

On June 9, 1911, another large specimen of this fish was taken in the laboratory pound net. Its extreme length was 17¼ inches, depth 6¼ inches; its dorsal spine was 2½ inches long, and the diameter of its eye ¾ of an inch. Its general color was a bright orange yellow, while in the dorsal region it was a dirty brownish black.

Smith assigns 2 feet as the maximum size of this fish, but these two are the largest the writer has seen. The second one unfortunately could not be dissected.

Leptecheneis naucrates (Linnaeus).

SHARK'S PILOT; REMORA.

Early in August, 1909, Coles brought in from Cape Lookout a *Leptecheneis naucrates* of large size. After being in weak formalin for a year, it measured 32 inches long over all. The sucker, which was 6¾ inches long and 2⅜ inches wide (outside measurements), had 22 valves. During the summer of 1910 Coles captured another fish of about the same size at the Cape. He says that specimens of this size are by no means rare there. This is undoubtedly due to the large number of great sharks, huge rays and giant turtles, their hosts.

On July 13, 1910, a 14-inch specimen of this fish was taken off the laboratory wharf with hook and line. This is the first instance known to the writer of this fish being caught in this manner, though Smith in his Fishes of North Carolina says that such captures are sometimes made and Coles affirms that they bite vigorously at the hook and give good sport. This specimen had 18 laminae in its sucker. Smith (1907) says the number varies from 20 to 28 for this fish and that Beaufort specimens generally have 23 laminae.

The writer took on a shark hook off the laboratory wharf at Beaufort in the summer of 1902, a 6-foot sharp-nosed shark (species undetermined) which had attached to it a remora 12 or 15 inches long. This sucker-fish was greatly disturbed as the shark was drawn up on the wharf. Whenever that part of its friend's body to which it was attached was drawn up out of the water, it would drop down into the water, dash wildly about, and then reattach itself lower down to again go through the same performance. An attempt was made to catch it with a dip net but it was too agile to permit this. When the shark was finally drawn up on the wharf, the remora disappeared into the deeper water.

Lophius piscatorius Linnaeus.

GOOSE-FISH; ANGLER.

During the winter of 1909 a fisherman found and brought to the laboratory a large *Lophius piscatorius* which had drifted on one of the marshes. Director Aller, not having any receptacle large enough to hold it, preserved only the head. Measured in a straight line from the tip of the lower jaw to a line joining the anterior edges of the bases of the pectorals, its length was 14½ inches, and its greatest width was 18 inches. The gape of the mouth from right to left was 12½ inches; the vertical gape, because of the bad condition of the head, could not be determined with any accuracy. The width (inside) between the eyes was 4½ inches. Both jaws were studded with sharp thorn-like teeth, the longest measuring ⅞ of an inch as it stood fixed in the jaw. The two spines on the head had lost their covering of flesh and skin. The shorter was 3¾ inches, the longer 5⅞ inches in length. The fore and aft measurement of the pectoral was 9½ inches, and its length from the body out was 6¾ inches. The goose-fish, locally called "all-mouth toad," is rarely found in Beaufort harbor, more frequently coming ashore at Cape Lookout.

Pterophryne histrio (Linnaeus).

SARGASSUM-FISH.

But little more abundant than the angler is its diminutive relative the sargassum-fish, which comes into Beaufort harbor anchored in the drifting seaweed of the same name. Sharp lookout was kept for this fish all summer (1910), but, despite the strong southern winds, no weed came in and the search was futile. This fish, like the angler, lays a long gelatinous egg raft in which the ova are imbedded. This was first noted by Smith (1898) at the Woods Hole laboratory, and later corroborated by Gudger (1905) at the Beaufort station.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

MAMMALS FROM YUNNAN AND TONKIN.

BY GLOVER M. ALLEN.

The Museum of Comparative Zoölogy has lately received a small collection of mammals from Tonkin and the neighboring portion of southeastern Yunnan, China. These were obtained from the same region whence the British Museum recently had a collection containing sundry remarkable novelties, described by Thomas and Dollman. Two of the squirrels in this second collection seem to represent undescribed races, and these are here named. I have also appended some additional notes on a fine adult male of the new snub-nosed monkey of Tonkin described by Dollman.

Sciurus castaneoventris haemobaphes subsp. nov.

Type.—Skin and skull, male, M. C. Z. 13,693, from Chih-ping, southeastern Yunnan, 26 February, 1911.

General characters.—A small squirrel of the *castaneoventris* type, differing from other described forms in the combination of blackish fingers and toes, buffy to pale ochraceous ears; the mixture of ochraceous hairs with the otherwise clear hazel of the throat, producing a more or less yellow patch, and the restriction of the bright hazel of the inferior side of the hind legs to a narrow area that does not quite reach the heel and does not include the anus and base of the tail.

Description.—Head, including cheeks and chin, dorsal surface of body and of limbs except the feet a uniform grizzled cream buff and black, slightly darker over the mid-dorsal area, where the individual hairs are either entirely black or black with one or two buff rings. Those with a buffy ring of about 2 mm. and a long black tip of 6 or 8 mm. predominate. On the tail these rings increase in number and extent, and form on the terminal two-thirds indistinct transverse bands, with an outer fringe formed by the long buff or ochraceous tips. At the tip of the tail the terminal ochraceous band and the subterminal black portions of the hairs are much longer then elsewhere and form thus a black patch with a distinct ochraceous tip. The ears are covered with short buff hairs, becoming in some specimens ochraceous but never the bright hazel of the belly. Feet darker than the back; the toes nearly black with a fine ticking of buffy. The under surfaces of body and limbs, except the chin, are clear bright hazel mixed on the upper throat with ochraceous hairs which stand in strong contrast and vary in amount from a few in the median line to a distinct patch tapering to the middle of the chest. The anal region and base of the tail below are like the back, instead of being included in the general chestnut color of the belly.

Skull.—The skull is distinctly smaller than that of the neighboring race *bonhotei* of which the Museum has a series from Szechwan.

Measurements.—The type was measured by the collector as follows: head and body, 240 mm.; tail, 155; hind foot, 51; ear, 24. The skull measures: condylobasal length, 48 mm.; basal length, 45; zygomatic breadth, 20; interorbital constriction, 17; nasals, 14; diastema, 10.5.

Remarks.—The Museum of Comparative Zoölogy has a fine series of *S. c. bonhotei* of Szechwan lately described by Messrs. Robinson and Wroughton, so that I have been able to make direct comparison between this and the series from the lower country in extreme southeastern Yunnan. The larger size, more buffy upper surfaces, bright chestnut ears, and clear ferruginous underparts including anus, base of tail, and legs to the sole of the feet distinguish *bonhotei* at once. From *S. c. michianus*, described by the same authors,* from Mee Chee, Yunnan, it differs in having the ears much paler than the belly, the hands and feet nearly black, and the hazel of the throat more or less mixed with ochraceous anteriorly. According to Bonhote, typical *castaneoventris* is found in Fokien to the northeast, and he has described a grayer race from Ningpo. The new subspecies here recognized seems to represent a southeasterly offshoot in the low hill country of this part of Yunnan.

Dremomys pernyi flavior subsp. nov.

Type.—Skin and skull, male, M. C. Z. 13,691, from Mongtz, southeastern Yunnan, 1911.

General characters.—Similar to *D. pernyi* but smaller and yellower in general coloration. The median area of the under side of the tail is yellowish or buffy instead of whitish.

Description.—Entire upper surface of the head (except ears), neck, body, limbs, and base of tail a nearly uniform grizzled buffy and black, slightly clearer buff on cheeks and hips, and with an ill defined pale buff eyering. Both surfaces of the ears covered with short hairs of a pale ochraceous-rufous, deepest at the posterior basal portion. Chin, throat, belly and inner sides of the legs white, washed with pale buff on the throat. The white hairs, except on the chin, have dark slaty bases. Anal region pale ochraceous-rufous, this color extending on to the base of the tail below, and the inner sides of the tibial margin of the legs.

Above, the tail is colored at the base like the back, but distally the hairs become tricolor, ochraceous-buff at the base, followed by a broad black band, and succeeded by a long white tip, so as to produce a somewhat barred effect with a white fringe. Below, the central area of the tail except at the very base, is cream buff, bordered by black and fringed with white, thus differing markedly from *D. pernyi* in which the long white-tipped hairs cover the greater part of the lower side.

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* Robinson, H. C., and Wroughton, R. C. On five new sub-species of Oriental Squirrels. Journ. Federated Malay States Museums 1911, vol. 4, p. 234.

Skull.—Compared with a series of skulls of typical *pernyi* from Szechwan in the collection of the Museum, that of the new race is decidedly smaller and with apparently shorter nasals.

Measurements.—The skin of the type bears the following measurements made by the collector: head and body, 164 mm.; tail, 126; hind foot, 38; ear, 24. The skull, which unfortunately lacks the condylar portion, measures: occipito-nasal length, 47.5; nasals, 16; fronto-parietal suture to tip of nasals, 36; least interorbital width, 14; zygomatic breadth, 23; diastema, 11; upper cheek teeth, 9.

Rhinopithecus avunculus Dollman.

In the Proceedings of the Zoological Society of London, 1912, part 2, p. 503, Mr. Guy Dollman has lately described a fourth species of the remarkable snub-nosed monkeys of eastern Asia. The type was an adult female from Yen-bay, Tonkin, and the specimen was accompanied by a young animal. The coloration is described as in general, "with dorsal surface of body black and underparts yellowish buff." This style of coloring more nearly resembles that of *R. roxellanae* than of *R. bieti*, and the skull likewise is more as in the former species.

The Museum of Comparative Zoölogy has just acquired a skin and skull of this fine monkey, representing an adult male, from Tonkin, probably near the type locality. The coloration is slightly different from that described for the type, in which the entire ventral surface of the body is yellowish buff, extending down on the inner sides of the legs to the hands and feet. In this male specimen, however, the "yellowish buff" is reduced to a collar, encircling the throat, except for the black dorsal area of the neck. The chin, cheeks, chest, belly and inner sides of the limbs are *white* with a scattering of long black hairs. A very faint buffy wash may be seen on the chest and arms, but this is hardly noticeable.

The measurements of this adult male considerably exceed those of the adult female as given by Dollman. I have appended therefore the collector's measurements of the male, together with the cranial measurements, and in parentheses after each, the corresponding dimensions as given for the type. Head and body, 1420 mm. (520); tail, 860 (660); hind foot [from dry skin], 190 (165); ear, 43 (40). Skull: greatest length, 129 (109); basilar length, 83 (68); zygomatic breadth, 96 (77); greatest breadth across orbital region, 87.5 (72.5); greatest diameter of orbit, 30 (28); interorbital constriction, 17. (11); greatest width of cranium, 79 (68.3); palatilar length, 42 (32.9); width of palate inside m^1, 24 (20.5); length of upper toothrow from front of first premolar to back of last molar, 31 (30).

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PROCEEDINGS
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FIVE NEW MAMMALS FROM ASIA.

BY N. HOLLISTER.

The following new forms of mammals have been found in the Asiatic collections in the United States National Museum during progress of work in determining a collection from the Altai Mountains. The descriptions are published here by permission of the Secretary of the Smithsonian Institution.

Lepus aurigineus sp. nov.

Type from Chiu Keang, northern Kiang-si, China. United States National Museum No. $\frac{13761}{38175}$, skin and skull of ♀ adult. Collected December 27, 1880.

General characters.—Externally much like *Lepus sinensis*, but more yellowish, less mottled with blackish; sides almost pure unmottled yellowish-buff. Skull with much broader and shorter nasals.

Color of type.—General color of upperparts yellowish-buff, mottled with brownish-black; darkest on head and lower back. Cheeks in front of whiskers, spot before eye, and eye ring, cream buff. Back of ears, outside, buffy brown, exactly the color of top of head, with buff border; inside of back of ears ochraceous; lining of ears cinnamon-ochraceous; tip black. Nape pale cinnamon; sides of body pale yellowish-buff. Legs outside and chest-band pale cinnamon; rest of underparts, including inner sides of legs, pure white, the hairs clear white to base.

Skull.—Differs from the skull of *Lepus sinensis* in being shorter; and in having greater interorbital breadth, much shorter and broader nasals, and heavier supraorbital processes.

Measurements from well shaped dry skin of type.—Length of head and body, 390 mm.; hind foot, 103. The specimen is marked by collector, "head to tail, 20 inches." Skull of type.—Greatest length, 76; zygomatic breadth, 39; greatest length nasals, 32.3; mesal length nasals, 22.2; greatest breadth nasals, 20; least breadth nasals, 12.4; least interorbital breadth, 17.1; length of upper tooth row, alveoli, 14.6.

Remarks.—The superficial resemblance of this hare to a specimen of

Lepus sinensis from Shanghai is remarkable; but a careful comparison of the two species discloses differences of such weight, that it seems unlikely they are of the same group, or that intergradation is possible.

Lepus quercerus sp. nov.

Type from Chuisaya Steppe, Altai Mountains, Siberia. United States National Museum No. 175,446, skin and skull of ♂ adult. Collected July 28, 1912, by N. Hollister. Orig. No. 4405.

General characters.—Like *Lepus zaisanicus* Satunin, but with much longer ears, much less gray, and with a tint of vinaceous-buff throughout coloration of upperparts.

Color of type.—General color of upperparts and sides pinkish-buff, mixed with blackish, and with a decided tint of vinaceous-buff. Sides of nose and base of ears gray; inside of back of ears pale Isabella color, buffy at fold; outside of back nearly white; lining of ears white, a dark brown stripe, for two-thirds the length, near border of buff; tips blackish, extending downwards for 15 millimeters on outside, but showing from inside only as a narrow rim. Nape clay color; rump grayer than back, lacking most of the buffy and vinaceous-buff wash. Tail white, with broad black band above. Outsides of legs pale cinnamon; chest-band dark clay color; rest of underparts, including insides of legs, white, the underfur narrowly gray at base.

Skull.—Differs from skull of *L. zaisanicus* in narrower interorbital region, closely compressed posterior lobe of supraorbital process, attenuated nasals, and less protruding incisors.

Measurements of type.—Head and body, 470 mm.; tail vertebræ, 86; hind foot, 115. Skull: Greatest length, 82; basal length, 64.5; zygomatic breadth, 41.5; greatest length nasals, 34.2; least interorbital breadth, 14.8; alveolar length of upper toothrow, 14.3.

Remarks.—Hares collected in the frontier range of the Little Altai, in the neighborhood of Tchegan-Burgazi Pass, have been provisionally referred to *Lepus zaisanicus* Satunin, with the description of which they agree very well. As Satunin does not describe nor figure the skull of this hare, it is of course impossible to say just what the relationship is. In the foregoing description of the hare of the Chuisaya Steppe, the comparisons are made with these specimens from the Tchegan-Burgazi Pass. The difference in color between the two species is even more pronounced in specimens in the juvenal and post-juvenal pelage than in the adults. The young of the species I have referred to *L. zaisanicus* are gray, while the young of *L. quercerus* in comparable pelage are decidedly yellowish-buff.

Lepus swinhoei sowerbyæ subsp. nov.

Type from Wu-tsai, 20 miles west of Ning-wu-fu, northern Shansi, China; 6000 feet. United States National Museum No. 172,628, skin and skull of ♂ adult. Collected February 5, 1910, by Arthur de C. Sowerby. Orig. No. 365.

General characters.—Like *Lepus swinhoei subluteus*, but with grayer rump, lighter pinkish-buff chest-band, and more white on undersides of fore legs.

Skull.—Larger and heavier than skull of *subluteus*, with larger audital bullæ.

Measurements of type.—Head and body, 445 mm.; tail vertebræ, 125; hind foot, 118; ear, 100. Skull: Greatest length, 89; basal length, 72; greatest length nasals, 38; greatest breadth nasals, 19; zygomatic breadth, 42.

Specimens examined.—Two, from the type locality.

At Mr. Sowerby's request this hare is named for Mrs. Sowerby, who accompanied her husband on the trip during which the type was collected and aided materially in the scientific work.

Lepus brachyurus angustidens subsp. nov.

Type from Tate Yama Mountain, Hondo Island, Japan. United States National Museum No. [illegible], skin and skull of ♂ adult. Collected December 14, 1882, by P. L. Jouy.

Characters.—Like *Lepus brachyurus brachyurus*, but more richly colored in both light and dark pelages; upper and lower teeth smaller, the upper cheek teeth conspicuously narrower.

Measurements of type skull.—Greatest length, 88.5 mm.; basal length, 71; zygomatic breadth, 44.5; least interorbital breadth, 18.3; least postorbital breadth, 10.5; greatest length of nasals, 39; length of upper tooth row, crowns, 15; greatest width upper molars, 6.2; length of lower tooth row, crowns, 15.7.

Remarks.—The northern mountain race appears to be a more richly colored animal than *brachyurus* in any phase; that is, specimens in the ordinary brown coat, and in the somewhat melanistic state common to both regions, are more richly colored than comparable examples from the Tokyo region. The difference in the size of the teeth is quite sufficient to warrant the separation, should the color difference prove unreliable. Temminck gave the distribution of *brachyurus* as all the Japanese Empire; but as the type specimens, still in the Leyden Museum, were collected by Siebold, there can be no doubt that, in dividing the species, the new name should be given to the form inhabiting the northern mountains. My comparisons have been made with a series of seven skins and skulls from Hitachi Province, north of Tokyo. The name *Lepus brachyotis* Swinhoe, Proc. Zool. Soc. London, 1862, p. 360, is an accidental renaming of *Lepus brachyurus* Temminck. I am informed by Dr. Leonhard Stejneger that the recognition of this additional Japanese hare is in entire accord with the faunal areas of Hondo.

Eutamias asiaticus altaicus subsp. nov.

Type from Tapucha, Altai Mountains, Siberia; 6900 feet. United States National Museum No. 175,501, skin and skull of ♂ adult. Collected August 8, 1912, by N. Hollister. Orig. No. 4474.

General characters.—Like ***Eutamias asiaticus asiaticus***, but darker and less brightly colored; rump, hips and legs especially darker, with less bright yellowish-buff in the coloration.

Skull.—The skull averages larger than that of *E.* ***asiaticus***; posterior border of zygomatic process of squamosal leaves braincase at same angle as general bow of zygomatic arch [in ***asiaticus*** more at right angles with sides of zygomata, with conspicuous concavity behind].

Measurements of type.—Head and body, 167 millimeters; tail vertebræ, 105; hind foot, without claws, 35.5. Skull: greatest length, 41.4; condylobasal length, 37.5; zygomatic breadth, 23.4; least interorbital breadth, 9.5; alveolar length of upper tooth row, 6.5.

Remarks.—As it becomes necessary to divide into two forms the chipmunks heretofore known as ***Eutamias asiaticus asiaticus*** (Gmelin), the name ***asiaticus*** may properly be restricted to the subspecies characterized by Dr. J. A. Allen in 1903* from Gichiga. In the present account of *E.* ***a. altaicus***, I have been able to compare the series of twelve specimens of the new form directly with six specimens from Gichiga, in the same pelage, kindly lent me by Doctor Allen.

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* Bull. Amer. Mus. Nat. Hist., XIX, pp. 137-139, 1903.

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PROCEEDINGS

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GENERAL NOTES.

A NEW NAME FOR *TANAGRA SCLATERI* BERLEPSCH.

Dr. C. W. Richmond (Proc. U. S. Nat. Mus., 35, No. 1656, Dec. 16, 1908, 644) has shown that *Tanagra* Linnaeus can not be used for the birds that have usually been placed in this genus, but that *Thraupis* Boie will have to be used. He fixes the type of *Tanagra* upon *Fringilla violacea* Linn., therefore *Tanagra sclateri* Berlepsch (Ibis, 1880, 112) becomes untenable on account of *Tanagra sclateri* (*Euphonia sclateri* Sundevall, Oefv. Vet. Ak. Förh. Stockh., 1869, 596), and the bird described by von Berlepsch under the above name may be called **Thraupis episcopus nesophilus.** —*J. H. Riley.*

THE NAMES OF THE ROCKY MOUNTAIN GOATS.

The specific name *montanus*, applied to the Rocky Mountain Goat (*Ovis montanus* Ord, 1815), is preoccupied by *Ovis montana* Schreber, Die Säugthiere, plate 294 D, published, according to Sherborn (P. Z. S., 1891, p. 587), in 1804; and by *Ovis montana* Tiedemann, Zoologie, I, p. 404, 1808, both synonyms of *Ovis canadensis* Shaw and *Ovis cervina* Desmarest, 1804. The earliest available name for the Mountain Goat is *Rupicapra americana* Blainville, 1816. Though described from "North America," it may properly be restricted to the first recognized form, long known as *Oreamnos montanus*, inhabiting the Cascade Mountains, and the nearby ranges. Blainville, in his preliminary arrangement of the ungulates, divided his comprehensive genus *Cerophorus* into what he called sub-genera, of which *Rupicapra*, with three species, including "*A. americana*"* is one; but in his diagnoses of new species which follows he first characterized the goat under the combination *Rupicapra americana*.

The name applied to one of the two subspecies of *Oreamnos montanus* described by Dr. J. A. Allen in 1904, *O. m. columbianus* (Bull. Amer. Mus. Nat. Hist., XX, p. 20), is preoccupied by the *Capra columbiana* of Desmoulins, 1823, a synonym of *Ovis montanus* Ord. On my calling Dr.

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* Not *Antilope americana* Ord, as stated by Palmer, Index Gen. Mamm., p. 613; but a *nomen nudum*, really referring to the animal he later diagnosed under the name *Rupicapra americana*, the Rocky Mountain Goat.

Allen's attention to this fact, he has suggested that I rename his race, and I therefore propose for it the name *Oreamnos americanus columbiæ*. The Rocky Mountain Goats, with the exception of *Oreamnos kennedeyi* Elliot, will stand then as follows:

Oreamnos americanus americanus (Blainville).

1815. *Ovis montanus* ORD, Guthrie's geogr., 2d Amer. ed., II, p. 292 (not *Ovis montana* SCHREBER 1804; not *Ovis montana* TIEDEMANN 1808).

1816. *R*[*upicapra*] *americana* BLAINVILLE, Bull. sci. soc. philom. Paris, p. 80. (North America.)

1817. *Mazama dorsata* RAFINESQUE, Amer. monthly mag., II, p. 44 (new name for *Ovis montanus* ORD).

1817. *Mazama sericea* RAFINESQUE, Amer. monthly mag., II, p. 44 (new name for *Rupicapra americana* BLAINVILLE).

1822. *Antilope lanigera* SMITH, Trans. Linn. soc., XIII, p. 38 (new name for *Rupicapra americana* BLAINVILLE).

1823. *Capra columbiana* DESMOULINS, Dict. class. hist. nat., III, p. 580 (new name for *Ovis montanus* ORD).

Oreamnos americanus missoulæ Allen.

1904. *Oreamnos montanus missoulæ* ALLEN, Bull. Amer. mus. nat. hist., XX, p. 20. (Missoula, Montana.)

Oreamnos americanus columbiæ new name.

1904. *Oreamnos montanus columbianus* ALLEN, Bull. Amer. mus. nat. hist., XX, p. 20 (Shesley Mountains, northern British Columbia; not *Capra columbiana* DESMOLINS 1823).

As we must date *Ovis montana* from Schreber 1804, instead of from Cuvier 1817, the name requires consideration, with *canadensis* and *cervina*, in the next contribution to the nomenclature of the Rocky Mountain Sheep. —*N. Hollister.*

THE TYPE LOCALITY OF *PROECHIMYS STEEREI* GOLDMAN.

When the original description of *Proechimys steerei* Goldman was published* the type locality was given as "Rio Purus, a southern tributary of the Amazon, in northwestern Brazil," this being at that time the only data available in regard to the specimens on which the species is based. A letter from Dr. J. B. Steere, the collector, bearing date of January 8, 1912, contains the additional information that the specimens all came from Hyutánahan, a small village of rubber gatherers, on the north side of the Rio Purus, in the upper part of its course. The species seemed to be abundant. —*E. A. Goldman.*

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* Proc. Biol. Soc. Wash., XXIV, pp. 238–239, Nov. 28, 1911.

ON A SPECIMEN OF *OVIS CALIFORNIANA* DOUGLAS IN THE NATIONAL MUSEUM.*

Recent writers on American wild sheep (Allen, Bull. Am. Mus. Nat. Hist., XXXI, p. 22; Grinnell, Univ. Calif. Pub. Zool., X, p. 150), in remarks on *Ovis californiana* Douglas, state that this species is unrepresented by typical specimens in museums, and is now probably extinct at the type locality. It may be of interest to note that the United States National Museum fortunately possesses a good skull with a complete skin of a four year old ram, which, though not from the exact type locality (near Mount Adams, Yakima County, Washington), is, nevertheless, from a locality in the Cascades near enough to answer all practical purposes as typical material. The specimen was collected on the north fork of the Methow River, Washington, in 1899, and was presented to the museum by Theodore Lyman, of Harvard University. Professor Lyman tells me that sheep still exist in small numbers in the vicinity where this specimen was collected. The skin is in the faded summer coat, and does not differ, except in smaller size, from skins in similar condition from the Rocky Mountains. The skull indicates a valid species, somewhat smaller than *canadensis*, and with horns resembling the horns of *Ovis stonei* more than those of *canadensis*. The horns are much lighter than in *canadensis*, and are about the size and general shape of horns of typical *stonei*, though less spreading; and exhibit the triangular cross section and flat front in a marked degree. The condylobasal length of the skull is 279 millimeters; the length of upper tooth row, crowns, 82. The teeth are, as compared with *canadensis*, relatively larger.

—*N. Hollister.*

TWO PREOCCUPIED NAMES.

Mr. Fred. Muir of the Hawaiian Sugar Planters' Experiment Station has called my attention to the following:

ZACALLES gen. nov. Pisces. Jordan and Snyder, Proc. U. S. Nat. Mus., 25, 1903, p. 448.

ZACALLES gen. nov. Ichneumonidæ Insectorum Foerster, Verh. ver. Reinl., Bonn., 25, 1869, p. 204.

The fish genus may be known as **Calliblennius.**

In 1901 Samuel Garman proposed *Woodworthia* for a new genus of Gekkonidæ from New Zealand. Bull. Mus. Comp. Zool., 39, 1901, p. 4, pl. 1, fig. 2-2x. This name has precedence over *Woodworthia* for a new genus in the group of the Polyclad Turbellaria proposed by Laidlaw in 1904. Ceylon Pearl Fisheries Rep. 2, 1904; Supl. Rep. 9, p. 128, pl. —., fig. 1 and 9.

The genus of worms may be known as **Idioplanoides** from its close relationship to the genus *Idioplana*.

—*T. Barbour.*

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* Published here by permission of the secretary of the Smithsonian Institution.

NOTE ON AN ISOPOD NAME.

In the Proceedings of the U. S. Nat. Museum, Vol. 42, 1912, pp. 173-174, in a paper entitled "Description of a new isopod crustacean belonging to the genus *Livoneca* from the Atlantic coast of Panama," the specific name *longistylis* was given to the species described. Since the publication of the paper, I found that Dana had previously used that name for a species of *Livoneca* from South America, which is described in U. S. Expl. Exp., Vol. 14, 1853, pp. 754-755. My species may, therefore, be named **Livoneca tenuistylis.**

—*Harriet Richardson.*

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A NEW PECCARY FROM COSTA RICA.

BY E. A. GOLDMAN.

While engaged in identifying mammals from Middle America the following unnamed race of the white-lipped peccary has been detected in the collection of the U. S. National Museum. The new form is based on a splendid series of 14 skulls and 5 hunter's skins collected by Prof. William M. Gabb at Talamanca, Costa Rica, nearly 40 years ago, and now kindly placed at my disposal by Mr. Gerrit S. Miller, Jr., Curator of Mammals. The specimens had been long ago assigned to *Dicotyles labiatus* Cuvier, now regarded as a synonym of typical *Tayassu albirostris* (Illiger), which is restricted to South America.

Tayassu albirostris spiradens subsp. nov.

COSTA RICAN WHITE-LIPPED PECCARY.

Type from Talamanca, Costa Rica, No. $\frac{12823}{14653}$, adult (hunter's skin and skull), U. S. National Museum, collected by William M. Gabb in 1874.

General characters.—Similar to *Tayassu albirostris ringens* in size and color, but white facial area more extensive, reaching in some specimens nearly to eyes; skull differing in important details, especially the broader molars and smaller first lower premolars. Differing from *Tayassu albirostris albirostris* in the more highly arched median frontal outline of braincase, anteriorly narrowed lower premolars, and more evenly tapering mandibular toothrows.

Color.—General color of upper parts varying from nearly pure black to black coarsely and rather inconspicuously mixed with tawny, the black purest along the median line and over lower part of back and rump, and the tawny annulated hairs appearing mainly on top and sides of head, sides of neck, shoulders and flanks; under parts blackish, becoming in some specimens grizzled grayish on pectoral and inguinal regions; top and sides of muzzle, chin and a triangular area extending posteriorly from angle of mouth along cheeks, narrowing to a point nearly under ears, white or yellowish white, this color more or less mixed with black forming supraorbital spots in some specimens; feet usually white or yellowish white, but varying to nearly pure black.

Skull.—In general outline resembling that of *T. a. ringens*, but zygomata more widely spreading; nasals broader, more abruptly tapering anteriorly, the free ends usually shorter; maxillae considerably swollen laterally above the alveoli of premolars as in *T. a. ringens;* molars broader; lower molariform toothrows broader posteriorly, narrower anteriorly; first lower premolars decidedly smaller with less prominent anterior cusps. Contrasted with the skull of *T. a. albirostris* the following differences are shown: Braincase more highly arched along median line of frontal region; maxillae more swollen outward above the alveoli of first premolars; palate narrower behind last molars; interpterygoid fossa narrower; mandibular toothrows more evenly tapering; second and third lower premolars much smaller and narrower anteriorly.

Measurements.—No skin measurements available. Skull (type): Greatest length, 280.5 mm.; condylobasal length, 245; zygomatic breadth, 120; interorbital breadth, 65; breadth across postorbital processes, 90; length of palate, 178.7; maxillary toothrow. 76.7; mandibular toothrow, 82.8; alveolar length of second lower molar, 15.5; anterior breadth of second lower molar, 11.9; posterior breadth of second lower molar, 14.7; length of first lower premolar, 7.9; anterior breadth of first lower premolar, 3.7; length of second lower premolar, 9.1; anterior breadth of second lower premolar, 4.6.

Remarks.—The Costa Rican white-lipped peccary seems rather more closely allied to *T. a. ringens* of southern Mexico than to *T. a. albirostris* as represented by three Brazilian skulls, but in combination of cranial and dental characters it differs notably from both. From *T. a. ringens* it is distinguished by broad molars and very small lower premolars. In the breadth of the molars it is similar to *T. a. albirostris*, but the individual teeth are narrowed anteriorly, instead of quadrate, resulting, especially in the lower jaw, in a more evenly tapering toothrow. This condition is especially noticeable in the second and third lower premolars when contrasted with those of *T. a. albirostris* which are very broad and massive across the anterior crowns.

The molar crowns in *T. a. spiradens* show signs of wear early in life, the cusps in the first and second molars becoming flattened on the tops before the third molar is fully in place, while in *T. a. ringens* they remain unworn for a considerably longer period. This difference in wear may be due to the more abrasive character of the food taken by the Costa Rican animal.

Specimens examined.—Total number, 17, all from Costa Rica as follows: Talamanca (type locality), 14; exact locality unknown, 3.

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PROCEEDINGS

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PHYSIGNATHUS COCINCINUS AND ITS SUBSPECIES.

BY THOMAS BARBOUR.

The Museum of Comparative Zoölogy has received recently from Koyobashi, the well-known Japanese collector, a lizard which is very interesting. A study of this specimen in connection with the relevant literature leads to the following conclusions.

Physignathus cocincinus was briefly described by Cuvier in the Regne Animal, Edition 2, Vol. 2, 1829, p. 41. It is the type species of the genus. The name was emended by Guérin (Icon. R. A. Rept., 1829-44, pl. ix, fig. 2) to *cochinchinensis* and Boulenger and Günther have followed him in this. Boulenger (Cat. Liz. Brit. Mus., I, 1885, p. 399) quotes Cuvier's specific name as *concinnus*, which is incorrect. In this he followed Gray, who in speaking of the lizard as *Lophura concinna* made the same error. Neither apparently realized that Cuvier was trying to latinize the words Cochin China. The original spelling has to be retained by the laws of modern nomenclature.

In 1861 Günther (Proc. Zool. Soc. Lond., p. 188) described *P. mentager* from Siam and three years later figured it in his Reptiles of British India (1864, p. 153, pl. xv).

The example which the Museum has recently acquired is from Laokay, Tonkin. It evidently represents an undescribed geographical race rather intermediate in characters between those previously characterized. The races may be diagnosed as follows:

P. cocincinus cocincinus Cuvier.

From Cochin China, probably from the southern region about Saigon. This section of the country was that best known in Cuvier's time.

Lateral teeth eighteen on each side. Six or seven enlarged shields along each side of the throat.

P. cocincinus mentager Günther.

From Siam.

Eleven or twelve lateral teeth. Eleven enlarged shields along each side of the throat.

P. cocincinus caudicinctus subsp. nov.

Type.—Skin of a large adult in alcohol with cleaned skull attached. Coll. Mus. Comp. Zool. No. 8352. From Laokay, Tonkin, Koyobashi, collector.

Closely related to the two preceding forms but differing as follows: lateral or molar-like teeth, eighteen on each side of upper jaw and fourteen on each side of lower. (This rather as in *P. c. cocincinus.*) A series of fourteen enlarged shields along each side of throat parallel with the infralabials. (In this respect tending toward the condition in *P. c. mentager.*)

The new form is thus evidently related to both the others and as their ranges probably meet and as intergrades probably occur in the boundary regions of their ranges, the three forms may best be considered geographic races of the one species.

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